APPENDIX D
USEPA NESHAPS

Appendix C. USEPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M)

AUTHORITY: Secs. 112 and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7412, 7601(a)).

SOURCE: 49 FR 13661, Apr. 5, 1984, unless otherwise noted.

§ 61.140 Applicability.

The provisions of this subpart are applicable to those sources specified in §§ 61.142 through 61.153.

§ 61.141 Definitions.

All terms that are used in this subpart and are not defined below are given the same meaning as in the Act and in Subpart A of this part.

Active waste disposal site means any disposal site other than an inactive site.

Adequately wetted means sufficiently mixed or coated with water or an aqueous solution to prevent dust emissions.

Asbestos means the asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite, anthophyllite, and actinolite-tremolite.

Asbestos-containing waste materials means any waste that contains commercial asbestos and is generated by a source subject to the provisions of this subpart. This term includes asbestos mill tailings, asbestos waste from control devices, friable asbestos waste material, and bags or containers that previously contained commercial asbestos. However, as applied to demolition and renovation operations, this term includes only friable asbestos waste and asbestos waste from control devices.

Asbestos material means asbestos or any material containing asbestos.

Asbestos mill means any facility engaged in converting, or in any intermediate step in converting, asbestos ore into commercial asbestos. Outside storage of asbestos material is not considered a part of the asbestos mill.

Asbestos tailings means any solid waste that contains asbestos and is a product of asbestos mining or milling operations.

Asbestos waste from control devices means any waste material that contains asbestos and is collected by a pollution control device.

Commercial asbestos means any asbestos that is extracted from asbestos ore.

Demolition means the wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations.

Emergency renovation operation means a renovation operation that was not planned but results from a sudden, unexpected event. This term includes operations necessitated by nonroutine failures of equipment.

Fabricating means any processing of a manufactured product that contains commercial asbestos, with the exception of processing at temporary sites for the construction or restoration of facilities.

Facility means any institutional, commercial, or industrial structure, installation, or building (excluding apartment buildings having no more than four dwelling units).

Facility component means any pipe, duct, boiler, tank, reactor, turbine, or furnace at or in a facility; or any structural member of a facility.

Friable asbestos material means any material containing more than 1 percent asbestos by weight that hand pressure can crumble, pulverize, or reduce to powder when dry.

Inactive waste disposal site means any disposal site or portion of it where additional asbestos-containing waste material will not be deposited and where the surface is not disturbed by vehicular traffic.

Manufacturing means the combining of commercial asbestos—or, in the case of woven friction products, the combining of textiles containing commercial asbestos—with any other material(s), including commercial asbestos, and the processing of this combination into a product.

Outside air means the air outside buildings and structures.

Particulate asbestos material means finely divided particles of asbestos material.

Planned renovation operations means a renovation operation, or a number of such operations, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Individual nonscheduled operations are included if a number of such operations can be predicted to occur during a given period of time based on operating experience.

Remove means to take out friable asbestos materials from any facility.

Renovation means altering in any way one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are excluded.

Roadways means surfaces on which motor vehicles travel. This term includes highways, roads, streets, parking areas, and driveways.

Strip means to take off friable asbestos materials from any part of a facility.

Structural member means any load-supporting member of a facility, such as beams and load supporting walls; or any nonload-supporting member, such as ceilings and nonload-supporting walls.

Visible emissions means any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

[49 FR 13661, Apr. 5, 1984; 49 FR 25453, June 21, 1984]

§ 61.142 Standard for asbestos mills.

Each owner or operator of an asbestos mill shall either discharge no visible emissions to the outside air from that asbestos mill or use the methods specified by § 61.154 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

§ 61.143 Standard for roadways.

No person may surface a roadway with asbestos tailings or asbestos-containing waste material on that roadway, unless it is a temporary roadway on an area of asbestos ore deposits.

[49 FR 13661, Apr. 5, 1984; 49 FR 25453, June 21, 1984]

§ 61.144 Standard for manufacturing.

(a) *Applicability.* This section applies to the following manufacturing operations using commercial asbestos.

(1) The manufacture of cloth, cord, wicks, tubing, tape, twine, rope, thread, yarn, roving, lap, or other textile materials.

(2) The manufacture of cement products.

(3) The manufacture of fireproofing and insulating materials.

(4) The manufacture of friction products.

(5) The manufacture of paper, millboard, and felt.

(6) The manufacture of floor tile.

(7) The manufacture of paints, coatings, caulks, adhesives, and sealants.

(8) The manufacture of plastics and rubber materials.

(9) The manufacture of chlorine.

(10) The manufacture of shotgun shell wads.

(11) The manufacture of asphalt concrete.

(b) *Standard.* Each owner or operator of any of the manufacturing operations to which this section applies shall either:

(1) Discharge no visible emissions to the outside air from these operations or from any building or structure in which they are conducted; or

(2) Use the methods specified by § 61.154 to clean emissions from these operations containing particulate asbestos material before they escape to, or are vented to, the outside air.

§ 61.145 Standard for demolition and renovation: Applicability.

The requirements of §§ 61.146 and 61.147 apply to each owner or operator

of a demolition or renovation operation as follows:

(a) If the amount of friable asbestos materials in a facility being demolished is at least 80 linear meters (260 linear feet) on pipes or at least 15 square meters (160 square feet) on other facility components, all the requirements of §§ 61.146 and 61.147 apply, except as provided in paragraph (c) of this section.

(b) If the amount of friable asbestos materials in a facility being demolished is less than 80 linear meters (260 linear feet) on pipes and less than 15 square meters (160 square feet) on other facility components, only the requirements of paragraphs (a), (b), and (c) (1), (2), (3), (4), and (5) of § 61.146 apply.

(c) If the facility is being demolished under an order of a State or local governmental agency, issued because the facility is structurally unsound and in danger of imminent collapse, only the requirements in § 61.146 and in paragraphs (d), (e), (f), and (g) of § 61.147 apply.

(d) If at least 80 linear meters (260 linear feet) of friable asbestos materials on pipes or at least 15 square meters (160 square feet) of friable asbestos materials on other facility components are stripped or removed at a facility being renovated, all the requirements of §§ 61.146 and 61.147 apply.

(1) To determine whether paragraph (d) of this section applies to planned renovation operations involving individual nonscheduled operations, predict the additive amount of friable asbestos materials to be removed or stripped over the maximum period of time a prediction can be made, not to exceed 1 year.

(2) To determine whether paragraph (d) of this section applies to emergency renovation operations, estimate the amount of friable asbestos materials to be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

(e) Owners or operators of demolition and renovation operations are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

[49 FR 13661, Apr. 5, 1984; 49 FR 25453, June 21, 1984]

§ 61.146 Standard for demolition and renovation: Notification requirements.

Each owner or operator to which this section applies shall:

(a) Provide the Administrator with written notice of intention to demolish or renovate.

(b) Postmark or deliver the notice as follows:

(1) At least 10 days before demolition begins if the operation is described in § 61.145(a);

(2) At least 20 days before demolition begins if the operation is described in § 61.145(b);

(3) As early as possible before demolition begins if the operation is described in § 61.145(c);

(4) As early as possible before renovation begins.

(c) Include the following information in the notice:

(1) Name and address of owner or operator.

(2) Description of the facility being demolished or renovated, including the size, age, and prior use of the facility.

(3) Estimate of the approximate amount of friable asbestos material present in the facility in terms of linear feet of pipe, and surface area on other facility components. For facilities described in § 61.145(b), explain techniques of estimation.

(4) Location of the facility being demolished or renovated.

(5) Scheduled starting and completion dates of demolition or renovation.

(6) Nature of planned demolition or renovation and method(s) to be used.

(7) Procedures to be used to comply with the requirements of this Subpart.

(8) Name and location of the waste disposal site where the friable asbestos waste material will be deposited.

(9) For facilities described in § 61.145(c), the name, title, and authority of the State or local governmental representative who has ordered the demolition.

(Approved by the Office of Management and Budget under control number 2060-0264.)

[49 FR 13661, Apr. 5, 1984; 49 FR 25453, June 21, 1984]

§ 61.147 Standard for demolition and renovation: Procedures for asbestos emission control.

Each owner or operator to whom this section applies shall comply with the following procedures to prevent emissions of particulate asbestos material to the outside air:

(a) Remove friable asbestos materials from a facility being demolished or renovated before any wrecking or dismantling that would break up the materials or preclude access to the materials for subsequent removal. However, friable asbestos materials need not be removed before demolition if:

(1) They are on a facility component that is encased in concrete or other similar material; and

(2) These materials are adequately wetted whenever exposed during demolition.

(b) When a facility component covered or coated with friable asbestos materials is being taken out of the facility as units or in sections:

(1) Adequately wet any friable asbestos materials exposed during cutting or disjointing operations; and

(2) Carefully lower the units or sections to ground level, not dropping them or throwing them.

(c) Adequately wet friable asbestos materials when they are being stripped from facility components before the members are removed from the facility. In renovation operations, wetting that would unavoidably damage equipment is not required if the owner or operator:

(1) Asks the Administrator to determine whether wetting to comply with this paragraph would unavoidably damage equipment, and, before beginning to strip, supplies the Administrator with adequate information to make this determination; and

(2) When the Administrator does determine that equipment damage would be unavoidable, uses a local exhaust ventilation and collection system designed and operated to capture the particulate asbestos material produced by the stripping and removal of the friable asbestos materials. The system must exhibit no visible emissions to the outside air or be designed and operated in accordance with the requirements in § 61.154.

(d) After a facility component has been taken out of the facility as units or in sections, either:

(1) Adequately wet friable asbestos materials during stripping; or

(2) Use a local exhaust ventilation and collection system designed and operated to capture the particulate asbestos material produced by the stripping. The system must exhibit no visible emissions to the outside air or be designed and operated in accordance with the requirements in § 61.154.

(e) For friable asbestos materials that have been removed or stripped:

(1) Adequately wet the materials to ensure that they remain wet until they are collected for disposal in accordance with § 61.152; and

(2) Carefully lower the materials to the ground or a lower floor, not dropping or throwing them; and

(3) Transport the materials to the ground via dust-tight chutes or containers if they have been removed or stripped more than 50 feet above ground level and were not removed as units or in sections.

(f) When the temperature at the point of wetting is below 0°C (32°F):

(1) Comply with the requirements of paragraphs (d) and (e) of this section. The owner or operator need not comply with the other wetting requirements in this section; and

(2) Remove facility components coated or covered with friable asbestos materials as units or in sections to the maximum extent possible.

(g) For facilities described in § 61.145(c), adequately wet the portion of the facility that contains friable asbestos materials during the wrecking operation.

§ 61.148 Standard for spraying.

The owner or operator of an operation in which asbestos-containing materials are spray applied shall comply with the following requirements:

(a) Use materials that contain 1 percent asbestos or less on a dry weight basis for spray-on application on buildings, structures, pipes, and conduits, except as provided in paragraph (c) of this section.

(b) For spray-on application of materials that contain more than 1 percent

EARL KAI CHANN AND ASSOCIATES, LTD
5232 EAST PIMA STREET, SUITE "A"
TUCSON, AZ 85712

602-325-5847 / FAX. 602-325-5849

TO _____

_____

_____

MEMO

DATE: _____
JOB NO. _____
REFERENCE: _____
ATTENTION: _____

Agriculture Research Service
U.S. Water Conservation Laboratories
4331 East Broadway
Phoenix, AZ 85040

MEETING NOTES

Date: April 25, 1990
Place: Water Conservation Lab. Meeting Room
Time: 9:00 AM
Present: John Replogle, Francis Nakayama, Allen Dedrick, Bert Clemmens, Bruce Kimball, Barbara Resnick, Shirley Rish, Ken Mullins, Kevin Martin and the Investigating Team.

1. Hazardous material disposal is a problem because there is not enough of it in quantity that the various disposal agencies will service the Lab. It was suggested that the Lab find a large user of the service and deliver it to them to enable proper pick up.
2. 4% of the Labs' budget is for Repair and Maintenance (R & M), but this is always exceeded resulting in items not repaired or maintained.
3. Testing of the fume hoods has occurred in the last 12 months and all passed.
4. Radio active isotopes are checked every 3 months, when in use. These occur in the testing instruments only.
5. Roof has problems with its connection to the parapet wall and the lack of downspout connections.
6. A/C zoning does not work anymore because partitions have moved changing the intended zones.
7. Discussion took place concerning the structural cracks in the Hydraulic Testing Lab.
8. Discussion took place concerning the structural columns and their bases occurring in the Greenhouse Bldg. #4. Upon further investigation we found an extremely serious situation where each column rest on a block atop of a corroded steel jack base surrounded by wet soil. This support system is not connected and relies on gravity and the electric conduits strapped to the columns for support.

COPY TO: _____ SIGNED: _____

9. Traffic: the center turn lane to enter the complex from the East is extremely narrow and hazardous during heavy traffic hours. Suggested they contact the City of Phoenix and relate the problem and the number of employees it endangers each day.
10. Discussion concerning the standing water on site after each rain. Identified drainage holding areas for run off.
11. The building is labeled as a Hazardous Building by the City of Phoenix and the Fire Department refuses to enter the building to fight any fire. Automatic Fire Extinguishing System should be installed for life safety purposes.
12. Comments and concern were expressed about the fire alarm system.
13. Excessive fan noise in Meeting Room.
14. Appears to be a lack of toilet facilities. Single fixture toilet rooms are predominant and if one is being used going to another building to locate another is not uncommon.
15. Water pressure is sometimes a problem when irrigating, many toilets become unusable.
16. GFCI outlets should be investigated for green house, plastic "baggies" is not and efficient means of protection.
17. Recoating of Hydraulic Testing Lab roof. (Foam roofing system over metal roof.)
18. Received Hazardous Materials Permit, City of Phoenix with attached chemical list. Fire Marshall Petition, reference to code violations and approved appeal for the Lab. The final document received was the Sealed Source Leak Test Report, USDA for Radioactive Materials.

Adjourned 10:35 AM

EARL KAI CHANN AND ASSOCIATES, LTD
5232 EAST PIMA STREET, SUITE "A"
TUCSON, AZ 85712

602-325-5847 / FAX. 602-325-5849

TO _____

_____

_____

MEMO

DATE: _____
JOB NO. _____
REFERENCE: _____
ATTENTION: _____

Agriculture Research Service
Western Cotton Research Laboratories
4135 East Broadway
Phoenix, AZ 85040

MEETING NOTES

Date: April 25, 1990
Place: Western Cotton Research Lab, Library
Time: 2:00 PM
Present: Tom Henneberry, John Radin, Doug Wilson, Nancy Parks, Ken Mullins, Kevin Martin and Investigating Team.

1. Questioned the ventilating system for the Chemical Storage room in main bldg. Is there supose to be four different vent systems for each catagory of chemicals?
2. The main building has a new roof but the Head House roof is questionable.
3. Discussed automatic fire sprinkler system. Building has been labeled Hazardous by the City of Phoenix and will not enter to fight fires. The Lab Wing is windowless and this usually dictates a sprinkler system.
4. Discussion concerning the hole cut in the walls between the Labs presently covered with plywood.
5. Do we need panic hardware on some of the exit doors?
6. Received Hazardous Materials Permit, City of Phoenix.

Adjourned 3:00 PM

COPY TO: _____ SIGNED: _____

CITY OF PHOENIX, ARIZONA
FIRE DEPARTMENT
DIVISION OF FIRE PREVENTION
620 W. Washington St. • Room 167 • Phoenix, AZ 85003

PERMIT NUMBER

HAZARDOUS MATERIALS PERMIT APPLICATION

For the confidential information of the Chief of the Division of Fire Prevention who shall use the data contained therein to evaluate the fire and explosion hazard.

ADDRESS 4331 E. BROADWAY PHOENIX, AZ 85040	OCCUPANCY NAME U.S. WATER CONSERVATION LABORATORY
BLDG./PROP. OWNER NAME U.S. GOVERNMENT PHONE 261-3714	RESPONSIBLE PARTY KEN G. MULLINS PHONE 261-3714

NOTE: FILL OUT COMPLETELY AND RETURN TO ADDRESS AT TOP OF PAGE WITHIN _____ DAYS.

1. Indicate by a "Yes or No" for each of the following hazardous materials whether they are to be used, processed or stored in this building. (See back for definitions)

FLAMMABLE LIQUIDS YES
FLAMMABLE GASES YES DUSTS NO FIBERS NO
COMBUSTIBLE LIQUID YES
COMBUSTIBLE DUST NO FIBERS NO

EXPLOSIVE AND UNSTABLE YES
CORROSIVE YES
TOXIC ~~X~~ YES
OXIDIZERS YES

2. Indicate equipment or process involving any of the above Material:

Hydraulic Equipment	☐	Dust Collectors	☐	Drying Rooms	☐
Indust./Medical Gas	☐	Electro Plating	☐	Flow Coaters	☐
Picking or Garnetting	☐	Spray Painting	☐	Dip Tanks	☐
Magnesium Processing	☐	Ovens, Process	☐	Baler or Shredder	☐
Salt Baths	☐	Welding/Cutting	☐	Others	☒

Others: RESEARCH

3. Separately any hazardous materials indicated in item 1. Show maximum quantities in use, storage or processing and show flash point of flammable and combustible liquids.

LIST HAZARDOUS MATERIALS	AMT. IN USE	AMT. IN STORAGE	FLASH PT. °F
NITRIC ACID, SULFURIC ACID, HCl, HClO4	VARIES	c. 12 GAL TOT.	
CYANIDE-K, ARSENIC OXIDE	VARIES	c. 1/2 LB TOT.	
CHLOROFORM	"	c. 2 GAL	
METHANOL	"	c. 6 GAL	52
ACETONE	"	c. 8 GAL	-4
CYCLOHEXANE	"	c. 6 GAL	-4
FORMALDEHYDE (FORMALIN)	"	c. 1 GAL	122
ISOPROPYL ALCOHOL	"	c. 8 GAL	53
ETHYL ALCOHOL	"	c. ~~263~~ 20 GAL	55
HYDROGEN PEROXIDE	"	c. 1 QT	
HEXANE	"	c. 6 GAL	-22
TETRAHYDROFURAN	"	c. 6 GAL	6
ACETYLENE GAS	"	1 CYLINDER	

I hereby certify that the use, storage or process of hazardous materials in this building ~~will be limited as indicated above.~~ SEE ATTACHED

Name _____ Date 9 Dec 87
Owner or Responsible Agent

PERSON TO CONTACT FOR ADDITIONAL HAZARDOUS MATERIAL INFORMATION.

Name T. A. RASNICK Phone 261-4356

OCCUPANT

90-10D
Rev. 2-80

Attachment to City of Phoenix Fire Department Hazardous Materials Permit Application.

With respect to wording "I hereby certify that the use, storage or processing of hazardous materials in this building will be limited as indicated above: since the nature of a research laboratory requires changes in number and types of chemicals, I cannot certify to limiting as indicated in part 3. Signatures are written with the understanding that our inventory will be maintained to insure maximum safety without being limited to materials that may, or may not, be in use in the future and those that may, or may not, be purchased for future research.

ADDENDUM TO HAZARDOUS MATERIALS PERMIT APPLICATION

Hazardous materials from item 1:

Hazardous material	In use	In storage	Flash pt.,°
Acetonitrile	1 gal.	c. 2 gal.	30
t-Butyl alcohol		<1 pt.	~~52~~
Carbon disulfide	Varies	c. 1 pt.	-22
Diethylamine	"	c. 1 gal.	20
Ether	"	c. 1 pt.	-49
Aluminum chloride	"	<1 lb.	
Barium oxide	"	<1 lb.	
Barium perchlorate	"	<1 lb.	
Calcium hydroxide	"	<1 lb.	
Deuterium oxide	"	c.75 ml	
Ferric chloride	"	<1 lb.	
Iodine	"	<1 lb.	
Lithium carbonate	"	<1 lb.	
Mercuric chloride	"	<1 lb.	
Phosphorus pentoxide	"	<1 lb.	
Potassium hydroxide	"	c. 5 lb.	
Soda lime	"	c. 5 lb.	
Sodium bisulfite	"	<1 lb.	
Sodium hydroxide	"	c. 3 lb.	
Sodium hypochlorite	"	<1 gal	
Stannous chloride	"	<1 lb.	
Zinc nitrate	"	<1 lb.	
Hydroxylamine hydrochloride	"	c. ½ lb.	
Mercaptoacetic acid	"	< ½ lb.	
Phenol	"	<1 lb.	
Phenylmercuric acetate	"	<1 lb.	
Trichloroacetic acid	"	c. 1 pt.	
Ammonium metavanadate	"	<1 lb.	
Ammonium molybdate	"	<1 lb.	
Barium carbonate	"	<1 lb.	
Barium chloride	"	<1 lb.	
Barium hydroxide	"	<1 lb.	
Barium nitrate	"	<1 lb.	
Cupric carbonate	"	<1 lb.	
Cupric chloride	"	<1 lb.	
Cupric sulfate	"	c. 3 lb.	
Mercuric chloride	"	<1 lb.	
Mercuric iodide	"	<1 lb.	
Mercuric oxide	"	< ½ lb.	
Mercuric sulfate	"	< ½ lb.	
Mercuric thiocyanate	"	< ½ lb.	
Mercury	"	c. 10 lb.	
Molybdenum trioxide	"	c. 3 lb.	
Potassium dichromate	"	< ½ lb.	
Selenium metal	"	< ½ lb.	
Silver nitrate	"	< ½ lb.	

asbestos on a dry weight basis on equipment and machinery, except as provided in paragraph (c) of this section:

(1) Notify the Administrator at least 20 days before beginning the spraying operation. Include the following information in the notice:

(i) Name and address of owner or operator.

(ii) Location of spraying operation.

(iii) Procedures to be followed to meet the requirements of this paragraph.

(2) Discharge no visible emissions to the outside air from the spray-on application of the asbestos-containing material or use the methods specified by § 61.154 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(c) The requirements of paragraphs (a) and (b) of this section do not apply to the spray-on application of materials where the asbestos fibers in the materials are encapsulated with a bituminous or resinous binder during spraying and the materials are not friable after drying.

(d) Owners and operators of sources subject to this section are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(Approved by the Office of Management and Budget under control number 2000-0264.)

§ 61.149 Standard for fabricating.

(a) *Applicability.* This section applies to the following fabricating operations using commercial asbestos:

(1) The fabrication of cement building products.

(2) The fabrication of friction products, except those operations that primarily install asbestos friction materials on motor vehicles.

(3) The fabrication of cement or silicate board for ventilation hoods; ovens; electrical panels; laboratory furniture, bulkheads, partitions, and ceilings for marine construction; and flow control devices for the molten metal industry.

(b) *Standard.* Each owner or operator of any of the fabricating operations to which this section applies shall either:

(1) Discharge no visible emissions to the outside air from any of the operations or from any building or structure in which they are conducted; or

(2) Use the methods specified by § 61.154 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

§ 61.150 Standard for insulating materials.

After the effective date of this regulation, no owner or operator of a facility may install or reinstall on a facility component any insulating materials that contain commercial asbestos if the materials are either molded and friable or wet-applied and friable after drying. The provisions of this paragraph do not apply to spray-applied insulating materials regulated under § 61.148.

§ 61.151 Standard for waste disposal for asbestos mills.

Each owner or operator of any source covered under the provisions of § 61.142 shall:

(a) Deposit all asbestos-containing waste material at waste disposal sites operated in accordance with the provisions of § 61.156; and

(b) Discharge no visible emissions to the outside air from the transfer of asbestos waste from control devices to the tailings conveyor, or use the methods specified by § 61.154 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air. Dispose of the asbestos waste from control devices in accordance with § 61.152(b) or paragraph (c) of this section; and

(c) Discharge no visible emissions to the outside air during the collection, processing, packaging, transporting, or deposition of any asbestos-containing waste material, or use one of the disposal methods specified in paragraphs (c) (1) or (2) of this section, as follows:

(1) Use a wetting agent as follows:

(i) Adequately mix all asbestos-containing waste material with a wetting agent recommended by the manufacturer of the agent to effectively wet dust and tailings, before depositing the material at a waste disposal site. Use the agent as recommended for the

particular dust by the manufacturer of the agent.

(ii) Discharge no visible emissions to the outside air from the wetting operation or use the methods specified by § 61.154 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(iii) Wetting may be suspended when the ambient temperature at the waste disposal site is less than −9.5°C (15°F). Determine the ambient air temperature by an appropriate measurement method with an accuracy of ±1°C(±2°F), and record it at least hourly while the wetting operation is suspended. Keep the records for at least 2 years in a form suitable for inspection.

(2) Use an alternative disposal method that has received prior approval by the Administrator.

§ 61.152 Standard for waste disposal for manufacturing demolition, renovation, spraying, and fabricating operations.

Each owner or operator of any source covered under the provisions of §§ 61.144 and 61.149 shall:

(a) Deposit all asbestos-containing waste material at waste disposal sites operated in accordance with the provisions of § 61.156; and

(b) Discharge no visible emissions to the outside air during the collection, processing (including incineration), packaging, transporting, or deposition of any asbestos-containing waste material generated by the source, or use one of the disposal methods specified in paragraphs (b)(1), (2), or (3) of this section, as follows:

(1) Treat asbestos-containing waste material with water:

(i) Mix asbestos waste from control devices with water to form a slurry; adequately wet other asbestos-containing waste material; and

(ii) Discharge no visible emissions to the outside air from collection, mixing, and wetting operations, or use the methods specified by § 61.154 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air; and

(iii) After wetting, seal all asbestos-containing waste material in leak-tight containers while wet; and

(iv) Label the containers specified in paragraph (b)(1)(iii) as follows:

CAUTION

Contains Asbestos
Avoid Opening or
Breaking Container
Breathing Asbestos is Hazardous
to Your Health

Alternatively, use warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.1001(g)(2)(ii).

(2) Process asbestos-containing waste material into nonfriable forms:

(i) Form all asbestos-containing waste material into nonfriable pellets or other shapes; and

(ii) Discharge no visible emissions to the outside air from collection and processing operations, or use the methods specified by § 61.154 to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air.

(3) Use an alternative disposal method that has received prior approval by the Administrator.

[49 FR 13661, Apr. 5, 1984; 49 FR 25453, June 21, 1984]

§ 61.153 Standard for inactive waste disposal sites for asbestos mills and manufacturing and fabricating operations.

Each owner or operator of any inactive waste disposal site that was operated by sources covered under § 61.142, § 61.144, or § 61.149 and received deposits of asbestos-containing waste material generated by the sources, shall

(a) Comply with one of the following:

(1) Either discharge no visible emissions to the outside air from an inactive waste disposal site subject to this paragraph; or

(2) Cover the asbestos-containing waste material with at least 15 centimeters (6 inches) of compacted nonasbestos-containing material, and grow and maintain a cover of vegetation on

the area adequate to prevent exposure of the asbestos-containing waste material; or

(3) Cover the asbestos-containing waste material with at least 60 centimeters (2 feet) of compacted nonasbestos-containing material, and maintain it to prevent exposure of the asbestos-containing waste; or

(4) For inactive waste disposal sites for asbestos tailings, apply a resinous or petroleum-based dust suppression agent that effectively binds dust and controls wind erosion. Use the agent as recommended for the particular asbestos tailings by the manufacturer of the dust suppression agent. Obtain prior approval of the Administrator to use other equally effective dust suppression agents. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

(b) Unless a natural barrier adequately deters access by the general public, install and maintain warning signs and fencing as follows, or comply with paragraph (a)(2) or (a)(3) of this section.

(1) Display warning signs at all entrances and at intervals of 100 m (330 feet) or less along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited. The warning signs must:

(i) Be posted in such a manner and location that a person can easily read the legend; and

(ii) Conform to the requirements for 51 cm×36 cm (20"×14") upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph; and

(iii) Display the following legend in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

Legend	Notation
Asbestos Waste Disposal Site	2.5 cm (1 inch) Sans Serif, Gothic or Block
Do Not Create Dust	1.9 cm (¾ inch) Sans Serif, Gothic or Block
Breathing Asbestos is Hazardous to Your Health	14 Point Gothic.

Spacing between any two lines must be at least equal to the height of the upper of the two lines.

(2) Fence the perimeter of the site in a manner adequate to deter access by the general public.

(3) Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access by the general public.

(c) The owner or operator may use an alternative control method that has received prior approval of the Administrator rather than comply with the requirements of paragraph (a) or (b) of this section.

§ 61.154 Air-cleaning.

(a) The owner or operator who elects to use air-cleaning, as permitted by §§ 61.142, 61.144, 61.147(c)(2), 61.147(d)(2), 61.148(b)(2), 61.149(b), 61.151(b), 61.151(c)(1)(ii), 61.152(b)(1)(ii), and 61.152(b)(2) shall:

(1) Use fabric filter collection devices, except as noted in paragraph (b) of this section, doing all of the following:

(i) Operating the fabric filter collection devices at a pressure drop of no more than .995 kilopascal (4 inches water gage), as measured across the filter fabric; and

(ii) Ensuring that the airflow permeability, as determined by ASTM Method D737-75, does not exceed 9 $m^3/min/m^2$ (30 $ft^3/min/ft^2$) for woven fabrics or 11 $m^3/min/m^2$(35 $ft^3/min/ft^2$) for felted fabrics, except that 12 $m^3/min/m^2$ (40 $ft^3 min/ft^2$) for woven and 14 $m^3/min/m^2$ (45 ft $^3 min/ft^2$) for felted fabrics is allowed for filtering air from asbestos ore dryers; and

(iii) Ensuring that felted fabric weighs at least 475 grams per square meter (14 ounces per square yard) and is at least 1.6 millimeters (one-sixteenth inch) thick throughout; and

(iv) Avoiding the use of synthetic fabrics that contain fill yarn other than that which is spun.

(2) Properly install, use, operate, and maintain all air-cleaning equipment authorized by this section. Bypass devices may be used only during upset or emergency conditions and then only for so long as it takes to shut down the operation generating the particulate asbestos material.

(b) There are the following exceptions to paragraph (a)(1):

(1) If the use of fabric creates a fire or explosion hazard, the Administrator may authorize as a substitute the use of wet collectors designed to operate with a unit contacting energy of at least 9.95 kilopascals (40 inches water gage pressure).

(2) The Administrator may authorize the use of filtering equipment other than that described in paragraphs (a)(1) and (b)(1) of this section if the owner or operator demonstrates to the Administrator's satisfaction that it is equivalent to the described equipment in filtering particulate asbestos material.

[49 FR 13661, Apr. 5, 1984; 49 FR 25453, June 21, 1984]

§ 61.155 Reporting.

(a) Within 90 days after the effective date of this subpart, each owner or operator of any existing source to which this subpart applies shall provide the following information to the Administrator, except that any owner or operator who provided this information prior to April 5, 1984 in order to comply with § 61.24 (which this section replaces) is not required to resubmit it.

(1) A description of the emission control equipment used for each process; and

(2) If a fabric filter device is used to control emissions, the pressure drop across the fabric filter in inches water gage; and

(i) If the fabric device uses a woven fabric, the airflow permeability in $m^3/min/m^2$ and; if the fabric is synthetic, whether the fill yarn is spun or not spun; and

(ii) If the fabric filter device uses a felted fabric, the density in g/m^2, the minimum thickness in inches, and the airflow permeability in $m^3/min/m^2$.

(3) For sources subject to §§ 61.151 and 61.152:

(i) A brief description of each process that generates asbestos-containing waste material; and

(ii) The average weight of asbestos-containing waste material disposed of, measured in kg/day; and

(iii) The emission control methods used in all stages of water disposal; and

(iv) The type of disposal site or incineration site used for ultimate disposal, the name of the site operator, and the name and location of the disposal site.

(4) For sources subject to § 61.153:

(i) A brief description of the site; and

(ii) The method or methods used to comply with the standard, or alternative procedures to be used.

(b) The information required by paragraph (a) of this section must accompany the information required by § 61.10. The information described in this section must be reported using the format of Appendix A of this part.

(Approved by this Office of Management and Budget under control number 2000-0264)

(Sec. 114, Clean Air Act as amended (42 U.S.C. 7414))

§ 61.156 Active waste disposal sites.

To be an acceptable site for disposal of asbestos-containing waste material under §§ 61.151 and 61.152, an active waste disposal site must meet the requirements of this section.

(a) Either there must be no visible emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited, or the requirements of paragraph (c) or (d) of this section must be met.

(b) Unless a natural barrier adequately deters access by the general public, either warning signs and fencing must be installed and maintained as follows, or the requirements of paragraph (c)(1) of this section must be met.

(1) Warning signs must be displayed at all entrances and at intervals of 100 m (330 ft) or less along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited. The warning signs must:

(i) Be posted in such a manner and location that a person can easily read the legend; and

(ii) Conform to the requirements of 51 cm × 36 cm (20" × 14") upright

format signs specified in 29 CFR 1910.145(d)(4) and this paragraph; and

(iii) Display the following legend in the lower panel with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

Legend	Notation
Asbestos Waste Disposal Site.	2.5 cm (1 inch) Sans Serif, Gothic or Block.
Do Not Create Dust	1.9 cm (¾ inch) Sans Serif, Gothic or Block.
Breathing Asbestos is Hazardous to Your Health.	14 Point Gothic.

Spacing between any two lines must be at least equal to the height of the upper of the two lines.

(2) The perimeter of the disposal site must be fenced in a manner adequate to deter access by the general public.

(3) Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access by the general public.

(c) Rather than meet the no visible emission requirement of paragraph (a) of this section, an active waste disposal site would be an acceptable site if at the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period is covered with either.

(1) At least 15 centimeters (6 inches) of compacted nonasbestos-containing material, or

(2) A resinous or petroleum-based dust suppression agent that effectively binds dust and controls wind erosion. This agent must be used as recommended for the particular dust by the manufacturer of the dust suppression agent. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

(d) Rather than meet the no visible emission requirement of paragraph (a) of this section, an active waste disposal site would be an acceptable site if an alternative control method for emissions that has received prior approval by the Administrator is used.

(Secs. 112 and 301(a) of the Clean Air Act as amended (42 U.S.C. 7412, 7601(a))

Hazardous material	In use	In storage	Flash pt. °F
Sodium fluoride	Varies	c. 1 oz.	
Zinc chloride	"	c. 1 lb.	
Brucine sulfate	"	c. 2 oz.	
Dichloromethane	"	c. 7 gal.	
Formaldehyde	"	c. 1 gal.	
Oxalic acid	"	c. 1 lb.	
Salicylic acid	"	c. 1½ lb.	
2,4-Dinitrophenol	"	¼ lb.	
Diphenylamine	"	c. 1 lb.	
1,10-Phenanthroline	"	c. 1 oz.	
Ammonium nitrate	"	c. 1 lb.	
Ammonium persulfate	"	c. 1 lb.	
Barium nitrate	"	c. 1 lb.	
Cadmium nitrate	"	c. 1 lb.	
Calcium hypochlorite	"	1 lb.	
Calcium nitrate	"	c. 5 lb.	
Cobalt nitrate	"	c. 1 lb.	
Hydrogen peroxide	"	c. 1 pt.	
Ferric nitrate	"	c. 1 lb.	
Lead nitrate	"	c. 1 lb.	
Lithium nitrate	"	c. 1 lb.	
Lithium perchlorate	"	c. 1 lb.	
Magnesium nitrate	"	c. 1 lb.	
Magnesium perchlorate	"	c. 1 lb.	
Manganese dioxide	"	c. 1 lb.	
OXONE	"	c. ¼ lb.	
Potassium chromate	"	c. 1 lb.	
Sodium persulfate	"	c. 5 lb.	
Sodium dichromate	"	c. ½ lb.	
Sodium nitrate	"	c. 1 lb.	
Silver nitrate	"	c. ¼ lb.	
Potassium hydrogen iodate	"	c. ¼ lb.	
Potassium nitrate	"	c. 2 lb.	
Potassium permanganate	"	c. 1 lb.	
Potassium persulfate	"	c. 1 lb.	
N,N_diethyl-p-phenylenediamine sulfate	"	c. ¼ lb.	
Hydrazine sulfate	"	c. 1 lb.	

CITY OF PHOENIX, ARIZONA
FIRE DEPARTMENT
ROOM 167, PUBLIC SAFETY BUILDING
620 W. WASHINGTON 85003
PHONE 262-6771

PETITION OF APPEAL TO THE FIRE MARSHAL

LOG NO.	DATE LOGGED OUT
0521	10/23/87
DATE RECEIVED	
CASE NO.	
HEARING DATE	TIME
DEPT. EMPLOYEE FAMILAR WITH PROJECT	
Mike McDermott	
OCC. TYPE	COMPLIANCE DATE

All appeals SHALL be detailed on this form. Supporting data may be attached and submitted if desired, but all entries and statements on this form SHALL be completed. Incomplete froms will not be accepted.

BUSINESS/OCCUPANCY NAME: U.S WATER CONSERVATION LAB — ADDRESS: 4331 E. BROADWAY PHOENIX, AZ 850[illegible]

BUILDING OWNER or CORPORATE AGENTS NAME: U.S GOVERNMENT — ADDRESS: 4331 E. BROADWAY PHOENIX AZ 850[illegible]

TENANT'S NAME: U.S. WATER CONSERVATION LAB — ADDRESS: 4331 E. BROADWAY PHOENIX AZ 850[illegible]

APPELLANT'S NAME: B. A. LASNICK — ADDRESS: 4331 E. BROADWAY PHOENIX AZ 850[illegible]

THIS APPEAL APPLIES TO (Check One)

☐ A PROJECT IN THE PLANS REVIEW STAGE. BUILDING SAFETY LOG NO. _____.

☒ AN ALLEGED FIRE CODE VIOLATION.

AN APPEAL IS HEREBY MADE TO THE FIRE MARSHAL FOR A VARIANCE FROM SECTION 20.1 OF THE PHOENIX FIRE CODE. BRIEFLY RESTATE THE REQUIREMENTS BEING APPEALED. LABS SHALL BE SEPARATED FROM NON-LAB AREAS BY MINIMUM 1-HR CONSTRUCTION

STATE IN DETAIL WHAT IS PROPOSED IN LIEU OF LITERAL COMPLAINCE WITH THE FIRE CODE. ~~AT THE TIME OF CONSTRUCTION~~ INVENTORY OF FLAMMABLES REDUCED TO ELIMINATE THE DANGER

[signature] — BUILDING OWNER'S SIGNATURE

[signature] — APPELLANT — TITLE: Safety Officer

(602) 261-4356 — BUILDING OWNER'S TELEPHONE NUMBER

(602) 261-4356 — APPELLANT'S TELEPHONE NUMBER

DECISION OF FIRE MARSHAL

☐ APPROVED ☐ APPROVED WITH STIPULATIONS ☐ DENIED ☐ SEE ATTACHMENT

DATE	FIRE DEPARTMENT OFFICIAL

91-48 REV. 7/86

APPEALS FILE

ATTACHMENT TO "PETITION OF APPEAL TO THE FIRE MARSHAL," U. S. Water Conservation Laboratory, 4331 E. Broadway Road, Phoenix, AZ 85040

The building in question was constructed in 1958 on what was then county property. No fire codes affecting construction were in effect at that time. To reduce danger of fire, we have reduced our inventory of flammables. Those still in storage are kept in flammable cabinets. Those in use comply with Mr. McDermott's suggestions.

Petition of Appeal to the Fire Marshal
Appeals Case No. 22-87-4
November 24, 1987

APPROVED WITH STIPULATIONS

Flammable and combustible liquids not in use shall be stored in approved cabinets. All storage of flammable and combustible liquids shall be in accordance with NFPA 30, Flammable and Combustible Liquids Code and the Phoenix Fire Code, not later than January 5, 1988.

Charles H. Kime

C. H. Kime, Assistant Chief/Fire Marshal
City of Phoenix Fire Department

CHK/BLK/kt/1976F

(2) 1/16/90

U.S. DEPAR OF AGRICULTURE

SEALED SOURCE LEAK TEST REPORT

INSTRUCTIONS: An acceptable leak test must be performed on appropriate sealed sources of radioactivity immediately upon receipt and at specified intervals. Complete all applicable items. Report must be signed by the responsible user. Submit report within one (1) week after the test to:
USDA Radiological Safety Staff, BA[redacted]
Additional forms are available from the Radiological Safety Staff only.

1. NAME OF RESPONSIBLE USER F. S. Nakayama

RSC NUMBER 04ARS 010-03

2. ADDRESS
USDA, ARS
WR, US Water Conservation Lab
4331 E. Broadway
Phoenix Arizona 85040

3. NAME, TITLE AND ADDRESS OF PERSON PERFORMING TEST *(If other than responsible user.)*
B. A. Rasnick, Physical Science Technician
U.S. Water Conservation Laboratory
4331 E. Broadway
Phoenix, AZ 85040

4. INSTRUMENTS USED TO PERFORM TEST *(Give make, model and detection system.)*
Nuclear-Chicago Scaler Model 2800

DEVICE		SOURCE					
Manufacturer (5)	Serial No./Model No. (6)	Manufacturer (7)	Serial No./Model No. (8)	Radioelement In Source (9)	Quantity of Activity in Source in Millicuries (10)	Date Leak Test Performed (11)	Amount of Removable Contamination in MICROCURIES (12)
1 --U.S. Radium Source	46545			Cs-137	5.000	01 Mar 90	0
2 --Nuc. Mat. Source AmBe	5 AM 135			Am-241	15.000	01 Mar 90	0
3 --Nuc. Mat. Source AmBe	50 AM 134			Am-241	150.000	01 Mar 90	0
4 --AECL Source RaBe	N-1-33			Ra-226	1.000	01 Mar 90	0
5 --Trox. M Gauge RaBe	N-2-18 104			Ra-226	2.000	01 Mar 90	0
6 --Trox. M Gauge RaBe	N-5-84 104			Ra-226	5.000	01 Mar 90	0

Inventory

13. ACTION TAKEN WHEN EXCESSIVE CONTAMINATION IS FOUND *(Continue on reverse if necessary.)*

14. SIGNATURE OF RESPONSIBLE USER
F. S. Nakayama / B. A. Rasnick

15. DATE
01 March 1990

Form AD-805 (11/82)

(2) ate 1/16/90

U.S. DEPA[illegible]T OF AGRICULTURE
SEALED SOU[illegible] LEAK TEST REPORT

INSTRUCTIONS: An acceptable leak test must be performed on appropriate sealed sources of radioactivity immediately upon receipt and at specified intervals. Complete all applicable items. Report must be signed by the responsible user. Submit report within one (1) week after the test to:
USDA Radiological Safety Staff, BARC-West, Beltsville, Maryland 20705
Additional forms are available from the Radiological Safety Staff only.

1. NAME OF RESPONSIBLE USER: F. S. Nakayama | RSC NUMBER: 04ARS 010-03

2. ADDRESS:
USDA, ARS
WR, US Water Conservation Lab
4331 E. Broadway
Phoenix, Arizona 85040

3. NAME, TITLE AND ADDRESS OF PERSON PERFORMING TEST *(If other than responsible user.)*

B. A. Rasnick, Physical Science Technician
U.S. Water Conservation Laboratory
4331 E. Broadway
Phoenix, AZ 85040

4. INSTRUMENTS USED TO PERFORM TEST *(Give make, model and detection system.)*

Nuclear-Chicago Scaler Model 2800

DEVICE		SOURCE					
Manufacturer (5)	Serial No./Model No. (6)	Manufacturer (7)	Serial No./Model No. (8)	Radioelement In Source (9)	Quantity of Activity in Source in Millicuries (10)	Date Leak Test Performed (11)	Amount of Removable Contamination in MICROCURIES (12)
7 --Trox. M Gauge AmBE	AM-7022 1255			Am-241	100.000	01 Mar 90	0
8 --U.S. Nuclear Source	F-108 375			Cs-137	100.000	01 Mar 90	0
9 --CPN Hydroprobe AmBe	H-39123070 503			Am-241	50.000	01 Mar 90	0
10 --CPN Hydroprobe AmBe	H-31073960 503			Am-241	50.000	01 Mar 90	0
11 --CPN Hydroprobe	H-32074498 503			Am-241	50.000	01 Mar 90	0
12 --Norton Vacuum Gauge	820-M-0044 MRC-820			Ra-226	0.100	01 Mar 90	0

Inventory

13. ACTION TAKEN WHEN EXCESSIVE CONTAMINATION IS FOUND *(Continue on reverse if necessary.)*

14. SIGNATURE OF RESPONSIBLE USER
F S Nakayama / BARasnick

15. DATE
01 March 1990

Form AD-805 (11/82)

RSO Copy

(2) ate 1/16/90

U.S. DEPA T OF AGRICULTURE
SEALED SOURCE LEAK TEST REPORT

INSTRUCTIONS: An acceptable leak test must be performed on appropriate sealed sources of radioactivity immediately upon receipt and at specified intervals. Complete all applicable items. Report must be signed by the responsible user. Submit report within one (1) week after the test to:
USDA Radiological Safety Staff, BARC West, Beltsville, Maryland 20705
Additional forms are available from the Radiological Safety Staff only.

1. NAME OF RESPONSIBLE USER F. S. Nakayama — **RSC NUMBER** 04ARS 010 0

2. ADDRESS
USDA, ARS
WR, US Water Conservation Lab
4331 E. Broadway
Phoenix, Arizona 85040

3. NAME, TITLE AND ADDRESS OF PERSON PERFORMING TEST *(If other than responsible user.)*
B. A. Rasnick, Physical Science Technician
U.S. Water Conservation Laboratory
4331 E. Broadway
Phoenix, AZ 85040

4. INSTRUMENTS USED TO PERFORM TEST *(Give make, model and detection system.)*
Nuclear-Chicago Scaler Model 2800

DEVICE		SOURCE					
Manufacturer (5)	Serial No./Model No. (6)	Manufacturer (7)	Serial No./Model No. (8)	Radioelement In Source (9)	Quantity of Activity in Source in Millicuries (10)	Date Leak Test Performed (11)	Amount of Removable Contamination in MICROCURIES (12)
13 --Perkin Elmer ECD	83106 Sigma 3			Ni-63	15.000		
14 --CPN Hydroprobe	H34125882 503			Am-241	50.000	01 Mar 90	0
15 --CPN Hydroprobe AmBe	H-30073383 503			Am-241	50.000	01 Mar 90	0
16 --Hydroprobe Neutron Moisture Gauge	H36097080 503			Am-241	50.0	01 Mar 90	0
17 --Tracerlab Gamma Source	770 R59-5			Cs-137	5.000	01 Mar 90	in store (0)
18 --Tracerlab Gamma Source	771 R59-5			Cs-137	5.000	01 Mar 90	in storag (0)

13. ACTION TAKEN WHEN EXCESSIVE CONTAMINATION IS FOUND *(Continue on reverse if necessary.)*

14. SIGNATURE OF RESPONSIBLE USER F S Nakayama / B A Rasnick

15. DATE 07 March 1990

Form AD-805 (11/82)

U.S. DEPART OF AGRICULTURE

SEALED SOUR LEAK TEST REPORT

INSTRUCTIONS: An acceptable leak test must be performed on appropriate sealed sources of radioactivity immediately upon receipt and at specified intervals. Complete all applicable items. Report must be signed by the responsible user. Submit report within one (1) week after the test to:
USDA Radiological Safety Staff, BARC-West, Beltsville, Maryland 20705
Additional forms are available from the Radiological Safety Staff only.

1. NAME OF RESPONSIBLE USER F. S. Nakayama | **RSC NUMBER** 04ARS-010-03(

2. ADDRESS
USDA, ARS
WR, US Water Conservation Lab
4331 E. Broadway
Phoenix, Arizona 85040

3. NAME, TITLE AND ADDRESS OF PERSON PERFORMING TEST *(If other than responsible user.)*

B. A. Rasnick, Physical Science Technician
U.S. Water Conservation Laboratory
4331 E. Broadway
Phoenix, AZ 85040

4. INSTRUMENTS USED TO PERFORM TEST *(Give make, model and detection system.)*

Nuclear-Chicago Scaler Model 2800

DEVICE		SOURCE					
Manufacturer (5)	Serial No./Model No. (6)	Manufacturer (7)	Serial No./Model No. (8)	Radioelement In Source (9)	Quantity of Activity in Source in Millicuries (10)	Date Last Test Performed (11)	Amount of Removable Contamination in MICROCURIES (12)
19 --Tracerlab Gamma Source	772 R59-5			Cs-137	5.000	01 Mar 90	in storage (0)
20 --Trox. M Gauge AmBe	AM-7068 1255			Am-241	100.000	01 Mar 90	in storage (0)
21 --CPN Hydroprobe AmBe	H39032648 503			Am-241	50.000	01 Mar 90	in storage (0)
22 --CPN Surface Probe	MM9032662 Mc-M			Am-241	50.000	01 Mar 90	in storage (0)
23 --Amersham Source AmBe	AMC-2232 AMC-36			Am-241	100.000	01 Mar 90	in storage (0)

13. ACTION TAKEN WHEN EXCESSIVE CONTAMINATION IS FOUND *(Continue on reverse if necessary.)*

14. SIGNATURE OF RESPONSIBLE USER F. S. Nakayama / B. A. Rasnick

15. DATE 01 March 1990

Form AD-806 (11/82)

BSO Copy

FIRE DEPARTMENT
DIVISION OF FIRE PREVENTION
620 W. Washington St. • Room 167 • Phoenix, AZ 85003

PERMIT NUMBER

HAZARDOUS MATERIALS PERMIT APPLICATION

For the confidential information of the Chief of the Division of Fire Prevention who shall use the data contained therein to evaluate the fire and explosion hazard.

ADDRESS: 4135 E. BROADWAY RD - Phoenix 261-3714
OCCUPANCY NAME: U.S. Dept. of Agriculture - Western Cotton Research Laboratory
BLDG./PROP. OWNER NAME: U.S. Dept of Ag. PHONE 261-3524
RESPONSIBLE PARTY: T.J. Henneberry / Nancy Curtice PHONE 261-3524

NOTE: FILL OUT COMPLETELY AND RETURN TO ADDRESS AT TOP OF PAGE WITHIN _____ DAYS.

Indicate by a "Yes or No" for each of the following hazardous materials whether they are to be used, processed or stored in this building. (See back for definitions)

FLAMMABLE LIQUIDS yes
FLAMMABLE GASES yes DUSTS NO FIBERS NO
COMBUSTIBLE LIQUID yes
COMBUSTIBLE DUST NO FIBERS NO
EXPLOSIVE AND UNSTABLE yes
CORROSIVE yes
TOXIC yes
OXIDIZERS yes

Indicate equipment or process involving any of the above Material:

Hydraulic Equipment	☐	Dust Collectors	☐	Drying Rooms	☐
Indust./Medical Gas	☒	Electro Plating	☐	Flow Coaters	☐
Picking or Garnetting	☐	Spray Painting	☐	Dip Tanks	☐
Magnesium Processing	☐	Ovens, Process	☐	Baler or Shredder	☐
Molten Salt Baths	☐	Welding/Cutting	☐	Others	☐

List separately any hazardous materials indicated in item 1. Show maximum quantities in use, storage or processing and show point of flammable and combustible liquids.

LIST HAZARDOUS MATERIALS	AMT. IN USE	AMT. IN STORAGE	FLASH PT.
LABORATORY CONTAINS: acids, oxidizers, chlorinated compounds, solvents, and organic & inorganic compounds			
Lab # 25 contains cesium source (1800 Ci)			
Chem storage contains above plus: herbicides, defoliants, and patented + experimental pesticides			
RADIATION laboratories contain small amounts of radioactive chemicals eg C^{14} + H^3 (millicurie amounts)			

I hereby certify that the use, storage or process of hazardous materials in this building will be limited as indicated above.

Signature Nancy J Curtice Owner or Responsible Agent Date 2/18/88

TO CONTACT FOR ADDITIONAL HAZARDOUS MATERIAL INFORMATION.

Name NANCY CURTICE Phone 261-3524

OCCUPANT

90-10D
Rev. 2-80

To: Earl Kai Chann
Tucson
FAX # 325-5849

Dr. T. J. Henneberry
Entomology/Cotton Insect Pest Management and Biology
Lab #'s 16, 17, 18, 19, 20, 22, 23 and Rearing

Dr. J. W. Radin
Physiology and Environmental Effects
Lab #'s 2, 3, 4, 11, 12, 14 and 15

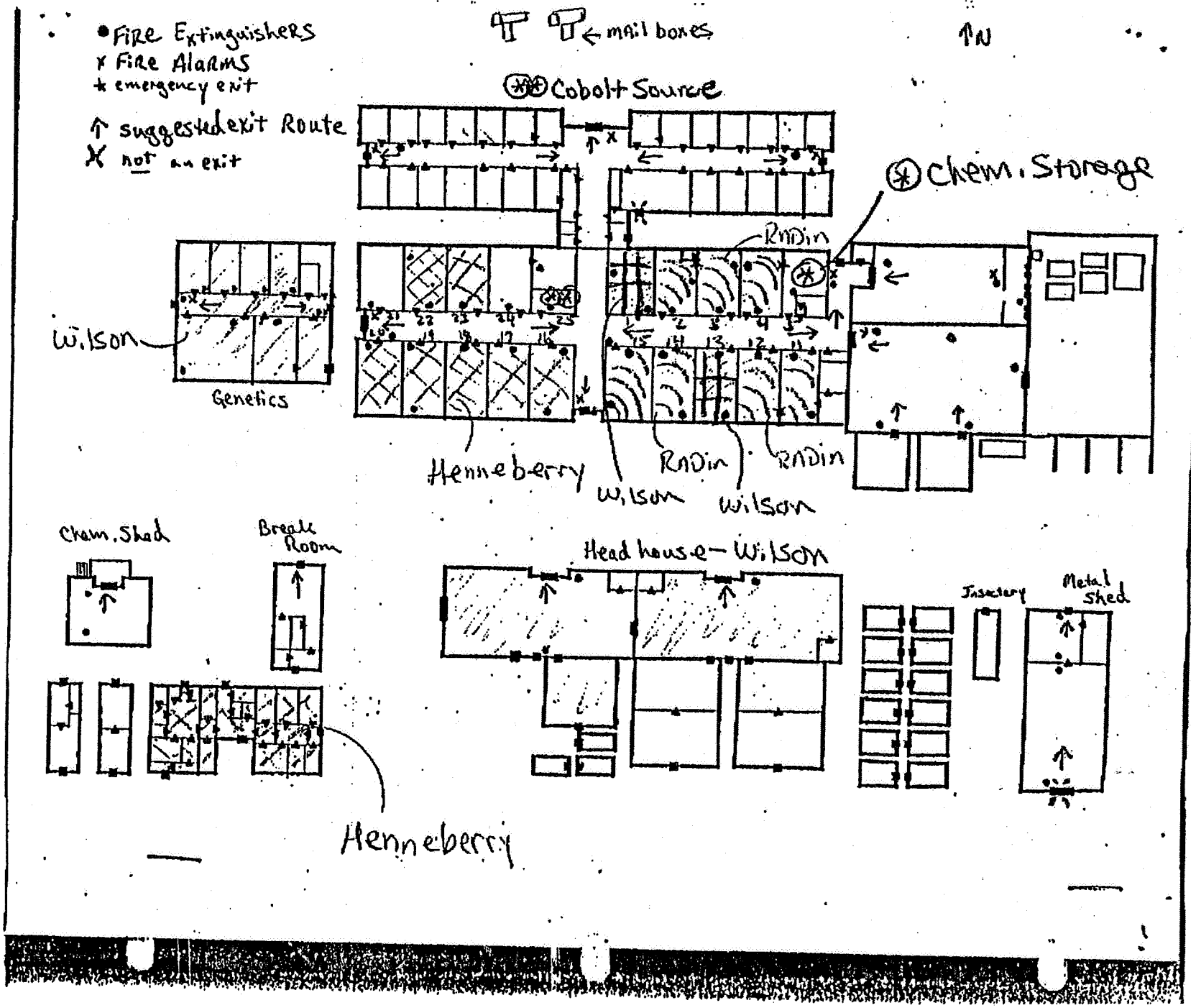
Dr. F. D. Wilson
Entomology/ Cotton Insect Genetics Research
Lab #'s 1, 13, Genetics (formerly toxicology) and Headhouse

All other areas are "common use" areas.

This is not a totally current inventory, but should give you an idea of the kinds and amounts of materials that we commonly keep around this place.

If any of this does not FAX well, I will be happy to mail you the info.

Nancy Parks
Safety Officer
WCRL


• Fire Extinguishers
x Fire Alarms
* emergency exit
↑ suggested exit Route
X not an exit
← mail boxes
↑N
Cobolt Source
Chem. Storage
RnDin
Wilson
Genetics
Henneberry
Wilson
RnDin
Wilson
RnDin
Chem. Shed
Break Room
Head house — Wilson
Insectary
Metal Shed
Henneberry

HMMP
Hazardous Material Management Plan

CHEMICAL AND HAZARDOUS MATERIALS INVENTORY
WILSON

Chemical	Flash Pt	Flamm'ty	Location	Person Respon.	Quantity	Type
Alcohol	55	moderate	?	Wilson	gal,3	
Caparol			?	Wilson	gal,2	Insectici
Ethanol,95%	55	moderate	1-13	Wilson	gal,0.5	
Formaldehyde	125	not	1-13	Wilson	liter,1.5	
Galecron 4E			?	Wilson	gal,1	Insectici
Gasoline	-45	highly	chm shed	Wilson	gal,1	Fuel
GH-27			?	Wilson	gal,1	Insectici
Glacial Acetic	104	slight	1-13	Wilson	gal,1.5	Acid
Karmex			?	Wilson	lb,4	Insectici
MSMA			?	Wilson	gal,4	Insectici
Pydrin			?	Wilson	qt,1	Insectici
Sulfuric Acid	not	not	?	Wilson	gal,4	Acid
Acetone	1.4	highly	chm shed	Bartlett	gal,0.5	
Acetone	1.4	highly	genetics	Bartlett	gal,3	
Cesium 137 source			1-25	Bartlett	ci.1800	irradiati source
Chloroform	not	not	chm shed	Bartlett	gal,5	
CO-2	not	not	genetics	Bartlett	6	Cylinder
Ethyl Alcohol	55	moderate	genetics	Bartlett	gal,10	
Formaldehyde	125	not	chm shed	Bartlett	gal,10	
Glycerol,glycerine	320	highly	chm shed	Bartlett	gal,10	
Methanol	52	highly	genetics	Bartlett	gal,5	
n-Propyl Alcohol	59	highly	genetics	Bartlett	gal,5	
Propyl Alcohol	59	highly	genetics	Bartlett	gal,5	
Spirit Fluid			genetics	Bartlett	gal,3	
Tetramethylethylen diamine(hydrazine)	126	slight	genetics	Bartlett	gms,1000	
Acetic Acid	104	slight	1-1	Flint	pint,1	
Acetone	1.4	highly	1-1	Flint	gal,1	
CO-2	not	not	1-1	Flint	small, 2	Cylinders
Ethanol	55	moderate	1-1	Flint	gal,1	
Ethanol	55	moderate	1-1	Flint	gal,4	
Formaldehyde	125	not	1-1	Flint	gal,1	
Hydrochloric Acid	not	not	1-1	Flint	pint,1	
Kerosene	not	slight	1-1	Flint	gal,1	Fuel (carcin
Nitrogen	not	not	1-1	Flint	1	Cylinder
Methylene Chloride dichloromethane	not	not	1-1	Flint	gal,1	

CHEMICAL AND HAZARDOUS MATERIALS INVENTORY
HRNNEBERRY

Chemical	Flash Pt	Flamm'ty	Location	Person Respon.	Quantity	Type
Acetic acid	104	slight	rearing	Moug	lbs,20	
Acetone	1.4	highly	chm shed	Bariola	gal,5+	
Chlorflurenol			chm shed	Bariola	gal,35	
Formaldehyde	125	not	rearing	Moug	gal.20	
Sodium Hypochlorit	not		rearing	Moug	gal,30-180	
Paint, enamel			chm shed	Leggett	gal,8	
Thinner			chm shed	Leggett	gal,3	
Methanol	52	highly	1-19	T.J.H.	qt,1	
Ammonium Hydroxide	not	slight	1-22	Akey	ltr,2	
Argon	not	not	1-24a	Akey		3 Cylinder
Benzene	12	highly	1-22	Akey	pt,1	
CO-2	not	not	1-21	Akey		2 Cylinder
Ethanol	55	moderate	1-22	Akey	gal,1	
Formaldehyde	125	not	1-22	Akey	gal,2	
Heptanal Practical CH3(CH2)5CHO			1-22	Akey	pt.0.5	
Hydrochloric Acid	not	not	1-22	Akey	ltr,2.5	
Nitric Acid	not	not	1-22	Akey	ltr,2.5	
Tolnene	40	slight	1-22	Akey	pt,2.5	
Vapon 2			1-22	Akey	gal,2	Insectici
Ethanol	55	moderate	1-23	Martin	gal,1	
Acetone	1.4	highly	~~ch.bldg.~~ sold	?	gal,140	
Benzene	12	highly	ch.bldg.	?		
Butanol	84	slight	ch.bldg.	?	gal,2	
Caustic Soda Bead Sodium Hydroxide	not	not	ch.bldg.	?		reacts w
Chloroform	not	not	ch.bldg.	?	ltr,4	
Formaldehyde	125	not	ch.bldg.	?	gal,5	
Glyceral,Glycerine	320	highly	ch.bldg.	?	gal,9	
Hydrochloric Acid		not	ch.bldg.	?	ltr,16	
Isobutyl Alcohol	84	slight	ch.bldg.	?	gal,5	
Kerosene	100	slight	ch.bldg.	?	gal,65	
Methanol	52	highly	ch.bldg.	?	ltr,8	
Methyl Parathion			ch.bldg.	?	gal,5	Insectici
Muriatic Acid, (HCl)	not	highly	ch.bldg.	?	lb, 128	
Nitric Acid	not	not	ch.bldg.	?	ltr,24	
Pencapp			ch.bldg.	?	gal,5	
Petroleum Ether, Benzine	0	highly	ch.bldg.	?	gal,5	
Pyridine	68	highly	ch.bldg.	?	ltr,4	
Stanffarpretar4-e			ch.bldg.	?	gal,5	
Sulfuric Acid	not	not	ch.bldg.	?	ltr,28	
Tert Amyl Alcohol	67	highly	ch.bldg.	?	pt,8	
Tertbutyl Alcohol		highly	ch.bldg.	?	gal,5	
Toluene	40	slight	ch.bldg.	?	ltr,20	

CHEMICAL AND HAZARDOUS MATERIALS INVENTORY
RADIN

Chemical	Flash Pt	Flamm'ty	Location	Person Respon.	Quantity	Type
Acetic Acid	104	slight	1-5	Guinn	ltr,21	
Acetone	1.4	highly	1-3	Guinn	ltr,8	
Acetone	1.4	highly	1-4	Guinn	ltr,5	
Acetone	1.4	highly	1-5	Guinn	ltr,4	
Acetonitrile	42	slight	1-4	Guinn	ltr,1	
Ammonium Hydroxide	not	slight	1-4	Guinn	ltr,1	
Ammonium Hydroxide	not	slight	1-3	Guinn	ltr,3	
Benzene	12	highly	1-3	Guinn	pt,1	carcinoge
Benzene	12	highly	1-5	Guinn	ltr,8	carcinoge
Butyl Alcohol	84	slight	flam cab	Guinn	gal,4	
Chloroform	not	not	1-5	Guinn	ltr,4	
Compressed Air	not	not	grn hs	Guinn		1 Cylinder
CO-2	not	not	grn hs	Guinn		1 Cylinder
CO-2	not	not	gro cham	Guinn		8 Cylinder
? (Prob CO-2)			gro cham	Guinn		10 Cylinder
Dichloromethane	not	not	1-4	Guinn	ltr,9	
Dichloromethane	not	not	1-5	Guinn	ltr,4	
Diethyl ether, ethyl ether	-49	highly	1-4	Guinn	ltr,4	
Dimethyl Sulfoxide (DMSO)	203	slight	1-5	Guinn	ltr,8	
Ethyl Acetate	24	highly	1-5	Guinn	ltr,6	
Ethyl Acetate	24	highly	1-3	Guinn	ltr,2	
Ethyl Acetate	24	highly	flam cab	Guinn	gal,5	
Ethyl Alcohol	55	moderate	flam cab	Guinn	gal,10	
Ethylene	-213	highly	gro cham	Guinn		1 Cylinder
Formaldehyde	125	not	1-5	Guinn	ltr,12	
Formic Acid	122	not	1-4	Guinn	pt,1	
Hexanes	-7	not	flam cab	Guinn	gal,3	
Heptane	25	highly	flam cab	Guinn	gal,3	
Hexane	-7	not	1-4	Guinn	ltr,5	
Hydrochloric Acid	not	not	1-5	Guinn	ltr,8	
Hydrochloric Acid	not	not	1-4	Guinn	ltr,3	
Isobutyl Alcohol	82	slight	1-3	Guinn	ltr,12	
Methanol	52	highly	1-4	Guinn	ltr,8	
Methanol	52	highly	1-3	Guinn	ltr,1	
Methanol,(waste)	52	highly	1-3	Guinn	ltr,4	
N Hexane	-7	moderate	1-5	Guinn	ltr,2	
Nitrogen	not	not	gro cham	Guinn		1 Cylinder
Nitrogen	not	not	wlkin fg	Guinn		1 Cylinder
Nitrogen	not	not	1-4	Guinn		2 Cylinder
Phosphoric Acid	not	not	1-5	Guinn	ltr,8	
Propanol2	59	moderate	1-5	Guinn	gal,2	
Propanol2	59	moderate	1-5	Guinn	ltr,8	
Pyridine	68	highly	1-5	Guinn	ltr,12	
Sulfuric Acid	not	not	1-5	Guinn	ltr,3	
Toluene	40	slight	1-5	Guinn	gal,2	
Xylene	81	slight	flam cab	Guinn	gal,5	

CHEMICAL AND HAZARDOUS MATERIALS INVENTORY
RADIN

Chemical	Flash Pt	Flamm'ty	Location	Person Respon.	Quantity	Type
Acetic Acid	104	slight	1-11&12	Radin	gal,2	
Ammonium Hydroxide	not	slight	1-11&12	Radin	gal,1	
Chloroform	not	not	1-11&12	Radin	gal,1	
CO-2	not	not	1-11&12	Radin		2 Cylinder
Compressed Air	not	not	1-11&12	Radin		8 Cylinder
Helium	not	highly	1-11&12	Radin		1 Cylinder
Hydrochloric Acid	not	not	1-11&12	Radin	gal,1	
Hydrogen	not	highly	1-11&12	Radin		1 Cylinder
Nitrogen	not	not	1-11&12	Radin		6 Cylinder
Oxygen	not	not	1-11&12	Radin		1 Cylinder
Phosphoric Acid	not	not	1-11&12	Radin	gal,1	
Pyridine	68	highly	1-11&12	Radin	gal,1	
Sulfuric Acid	not	not	1-11&12	Radin	gal,1	
Acetone	1.4	highly	1-14	Hendrix	gal,1	
Acetonitrile	42	slight	1-14	Hendrix	gal,2	
butanol	84	slight	1-14	Hendrix	gal,1	
Diethyl ether, ethyl ether	-49	highly	1-14	Hendrix	gal,2	
Ethanol	55	moderate	1-14	Hendrix	gal,12	
Ethanol	55	moderate	chm shed	Hendrix	gal,55	flam. cab
Helium	not	highly	1-25	Hendrix		1 Cylinder
Hexane	-7	not	1-14	Hendrix	gal,1	
Hydrochloric Acid	not	not	1-14	Hendrix	gal,1	
Liquid Nitrogen (non-compressed)			1-25	Hendrix		1 Cylinder
Methanol	52	highly	1-14	Hendrix	gal.3	
Nitric Acid	not	not	1-14	Hendrix	gal.1	
Nitrogen	not	not	1-14	Hendrix		3 Cylinder
n propanol	59	highly	1-14	Hendrix	gal,1	
Oxygen	not	not	1-14	Hendrix		2 Cylinder
Oxygen	not	not	1-25	Hendrix		1 Cylinder
Propanol2	59	highly	1-14	Hendrix	qt,2	
Q gas(counting gas)			1-25	Hendrix		2 Cylinder
t-but,me Ether	-49	highly	1-14	Hendrix	gal,1	
Toluene	40	slight	1-14	Hendrix	gal,2	
Sulfuric Acid	not	not	1-14	Hendrix	gal.1	
About 50 compounds that are highly reactive, explosive or flammable for example:						
Dinitrophenyl-hydrazine 2-4	0	explosive	1-14	Hendrix	gm,10	

CHEMICAL AND HAZARDOUS MATERIALS INVENTORY
APHIS

Chemical	Flash Pt	Flamm'ty	Location	Person Respon.	Quantity	Type
Ambush			chm shed	Nick	qt,2	Insectici
Bran Bait (2 paper bags)			chm shed	Nick	lb,50	Insectici
Caryophyllene Extra FCC			chm shed	Nick	lb,25	
Cygon 2E			chm shed	Nick	gal,1	Insectici
Comate 102			chm shed	Nick	gal,3	Insectici
Dimilin 25W			chm shed	Nick	lb,2	Insectici
Hexane			chm shed	Nick	gal,15	
Lance 4G			chm shed	Nick	lb,10	Insectici
Malathion CR			chm shed	Nick	gal,55	Insectici
Malathion ULV			chm shed	Nick	gal,5	Insectici
Mesuro WP			chm shed	Nick	lb,5	Insectici
Misc snail bait			chm shed	Nick	sm bxs, 3	
Orthene 75S soluble powder			chm shed	Nick	lbs,140	Insectici
Orthene Snail Bait			chm shed	Nick	lb,2	Insectici
Orthene speciality concentrate			chm shed	Nick	lb,12	Insectici
Pyreone			chm shed	Nick	qt,1	Insectici
Sevin 4 oil		moderate	chm shed	Nick	gal,5	Insectici
Sevin 4 oil (1 55 gal drum)		moderate	chm shed	Nick	gal,25	Insectici
Sevin 4 oil (2 drums)		moderate	chm shed	Nick	gal,110	Insectici
Sevin 20% WP			chm shed	Nick	lb,40	Insectici
Sevin 20% bait			chm shed	Nick	lb,25	Insectici
Sevin SL2			chm shed	Nick	lb,20	Insectici
Sevin UCSF			chm shed	Nick	lb,5	Insectici
Snail and slug bait M			chm shed	Nick	lb,50	Insectici
Snail and Slug bait grandules			chm shed	Nick	lb,50	Insectici
Snail bait 2% UC 51762			chm shed	Nick	lb,3	Insectici
Triton X190			chm shed	Nick	qt,2	

Hazardous Chemicals for Disposal November 1989

CHEMICAL NAME	approximate amounts
Aldoxycarb	pounds 5
Bolstar Technical Insecticide	ounces 4
Decicate	liter 1
Def. 6 Emulsifiable Defolient	gallon 1
Desicant L-10	gallon 1/2
Diazonon	bag
Dropp Cotton Defolient	pound 1
Hydrogen Sulfide	cylinder (20 lb)
Insecticide?	MJB can
Lead Acetate	ml 100
Mercurial Seed Disinfectant	gallon 5
Mercury	waste
PCNB 10 Granular	pounds 10
Potassium Cyanide	qt. 1
Resmethrin Aerosol Generator	
Sodium Carbnate plus Sulfuric Acid	
Surfactant plus Harvade plus Water	gallon 2 x 1 (almost empty)
Toluene	gallon 1
Vapo with Baygon Aerosol	ounce 6 x 6

these are located in the chemical shed (building)

U.S. WATER AND COTTON RESEARCH LABORATORIES
CODE CHECK REVIEW

I. WATER CONSERVATION LABORATORIES

A. LABORATORY BUILDING (1)

Office - Business - 8,000 S.F.
Laboratory - Hazardous - 3,840 S.F.
Occupants - 11,840 S.F. - 100 S.F./Person = 119 Occupants

B. OFFICE/LABORATORY AND MAINTENANCE SHOP BUILDING (2 AND 3)

Office/Laboratory - Business - 2,800 S.F.
Maintenance SHop - Industrial - 3,000 S.F.
Occupants - 5,800 S.F. - 100 S.F./Person = 58 Occupants

C. GREENHOUSE BUILDING (4)

Greenhouse - Storage 1,600 S.F.
Occupants - 1,600 S.F. - 300 S.F./Person = 6 Occupants

D. HYDRAULIC TESTING LABORATORY BUILDING (6)

Office - Business - 1,600 S.F.
Laboratory - Industrial - 4,000 S.F.
Occupants - 5,600 S.F. - 100 S.F./occupant = 56 Occupants

II. WESTERN COTTON RESEARCH LABORATORIES

E. OFFICE/LABORATORY BUILDING (001 AND 007)

Office - Business - 6,600 S.F.
Laboratory - Hazardous - 11,600 S.F.
Occupants - 18,200 S.F. - 100 S.F./Person = 182 Occupants

F. GENETICS BUILDING (002)

Laboratory - Hazardous - 2,600 S.F.
Occupants - 2,600 S.F. - 100 S.F./Person = 26 Occupants

G. MECHANICAL EQUIPMENT AND GROWTH CHAMBER BUILDING

Growth Chamber - Industrial 3,100 S.F.
Mechanical Equipment - Auxiliary 2,600 S.F.
Greenhouse - Auxiliary
Occupants - 3,100 S.F. - 100 S.F./Person = 31 Occupants

H. HEADHOUSE/GREENHOUSES BUILDING (003)

Headhouse Storage - 3,350 S.F.
Greenhouse - Auxiliary
Occupants - 3,350 S.F. - 300 S.F./Person = 12 Occupants

I. INSECT REARING BUILDING (030)

Laboratory - Industrial - 2,400 S.F.
Occupants - 2,400 S.F. - 100 S.F./Person - 24 Occupants

J. CHEMICAL STORAGE BUILDING (004)

Storage - 900 S.F.
Occupants - 900 S.F. - 300 S.F./Person = 3 Occupants

CODE CHECK REVIEW

APPLICABLE ODES:
UNIFORM BUILDING CODE: 1988
PHOENIX CONSTRUCTION CODE: LATEST REVISIONS
NFPA 101 LIFE SAFETY CODE: 1988
FFPA 45 FIRE PROTECTION FOR LABORATORIES USING CHEMICALS: 1986

SUMMARY:

The main laboratory and office for both the Water Conservation and Cotton Research Facilities are posted as Hazardous Buildings by the Phoenix Fire Department. A violation of Section 20.1 of the Phoenix Fire Code, which states that labs shall be separated from non-lab areas by minimum 1-hour construction, was appealed by the Water Conservation Lab in 1987. This appeal was approved by the Fire Marshall with stipulation that all flammable and combustible liquids not in use shall be stored in approved cabinets. Although the facilities are technically operational, there are certain corrective alterations that need to be installed to provide minimum standards for public safety, health and accessibility.

Safety of the occupants is of prime concern in the design of the circulation and fire preventive and/or extinguishing systems. Health initiating measures include the mechanics of air quality and the availability of personal sanitation. Accessibility to the premises and to the safety and health oriented features is a non-discriminatory inclusion for equal opportunity. The following is a list of codes that will provide a reasonable degree of safety, health and accessibility to persons occupying the existing facilities by providing for alterations to the buildings which do not conform with the minimum requirements of these codes.

CODES:

I. EXITS

A. UBC - Appendix - Chapter I, Division I, Section III (c) "Corridors of Groups A, B, E, I, H and R, Division I Occupancies serving as an exit for an occupant load of 30 or more shall have walls and ceilings of not less than one-hour fire-resistive construction as required by this code.

EXCEPTION: Existing corridor walls, ceilings and opening protection not in compliance with the above may be continued when such buildings are protected with an approved automatic sprinkler system throughout."

B. NFPA 101 - Chapter 5 - Section 5 Means of Egress "5-2.1.4.1 Doors shall swing in the direction of exit travel: 5-11.3 At least two (2) exits shall be provided from each building or hazardous areas thereof. 5-11.4 Means of egress shall be so arranged that there are no dead end pockets, hallways, corridors, passageways or courts."

2. FIRE PROTECTION

A. NFPA 45 - TABLE 3-1
Depending on the Fire Hazard Class, A, B or C, laboratories require a 1-2 hour separation for non-sprinkled areas and non-combustible (non-rated) - 1 hour separation for sprinkled areas.

UBC - Appendix, Chapter 1, Division I, Section 116 "When approved by the building official, existing wood lath and plaster in good condition or 1/2 inch gypsum wallboard may be acceptable where one-hour occupancy separation are required."

B. NFPA 45 - Chapter 4 - Fire Protection

"4-1.1. All laboratory units shall be provided with fire protection appropriate to the fire hazard as follows:

a. Portable fire extinguishers (see Section 4-4).
b. Fire alarms systems (see Section 4-5).
c. Evacuation and emergency plans (see Section 4-6).

C. NFPA 45 - Chapter 7 - Chemical Storage, Handling and Waste Disposal.

Depending on the types and amounts of chemicals being used, strict compliance needs to be adhered to this chapter and NFPA 30- FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE. These two sources mandate provisions for working with hazardous chemicals.

3. HEALTH

A. USEPA - National Emission Standards for Hazardous Air Pollutants, Asbestos Regulations.

This portion of the Clean Air Act sets guidelines for abatement of asbestos as detailed in the enclosed survey.

B. Phoenix Construction Code - Appendix C, Minimum Plumbing Facilities.

This table sets minimum plumbing fixture requirements for the facility.

4. ACCESSIBILITY

A. UBC - Section 511 states that access to toilets and other facilities by the physically handicapped is required as set by Table No. 33-A, Minimum Egress and Access Requirements.

5. BUILDING SERVICES

A. Plumbing, Mechanical and Electrical codes are referenced in the individual Deficiency Sheets.

B. Equivalent Safety. When this Section requires compliance with specific provisions of this Code applicable to new buildings and it is claimed that compliance with such provisions is impracticable, the applicant may appeal in writing to the Building Official identifying design solutions which will provide equivalent safety. The Building Official may accept such equivalent designs or, where circumstances warrant, may waive specific requirements of this Code applicable to new buildings where in the judgment of the Building Official application of such requirements would be impractical from a cost benefit standpoint. Exception: The fire sprinkler requirements for high-rise buildings, Section 1503, shall not be waived.

C. Additions. Additions shall not increase the total height or area of the building beyond that allowed by Part 7.

D. The word "building," as used herein, includes the building utilities.

✱ **104.03 MAJOR WORK ON EXISTING BUILDINGS.** Additions, alterations or repairs made within any 12 month period which:

(1) exceed 100 percent of the value of the existing building, or

(2) exceed 50 percent of the value of the existing building which is high rise as defined in Section 1500,

shall comply with this Subsection.

The entire building shall be investigated by an architect or engineer registered in Arizona to determine compliance with the requirements of this Code for new buildings. Non-conforming conditions shall be corrected to comply with the requirements of this Code for new buildings. Exception: The investigation need not include a structural analysis if the structure was built after January 1, 1965, and (1) the existing structural system is receiving no alterations or repairs, and (2) a proposed addition derives no lateral or gravity load support from the existing structural system.

✱ **104.04 MODERATE WORK ON EXISTING BUILDINGS.** Additions, alterations and repairs made within any 12 month period which:

(1) exceed 25 percent but less than 100 percent of the value of the existing building, or

(2) exceed 25 percent but less than 50 percent of the value of the existing building which is high rise as defined in Section 1500,

shall comply with this Subsection.

A. Additions. All new work shall conform to the requirements of this Code. Proposed additions which depend upon the existing structural system for lateral or gravity load support shall require the submittal of structural analysis which shows compliance with the structural provisions of this Code for the entire new and existing structural system.

B. Structural Alterations. Proposed alterations or repairs to any part of the structural system shall be substantiated by structural analysis and plans which shows that the gravity and lateral load carrying capacity of the system is not reduced. In addition, for buildings built prior to January 1, 1965, such structural analysis shall show that the building structure is not, or after repair will not be, unsafe as defined in Subsection 205.01.

In lieu of the structural analysis required above, the architect or engineer may furnish a written statement to the Building Official that (1) the alteration or repair will not reduce the gravity and lateral load carrying capacity of the structural system and (2) for buildings built prior to January 1, 1965, the building structure is not, or after repair will not be, unsafe as defined in Subsection 205.01.

C. Nonstructural Alterations. Nonstructural alterations and repairs may be made to an existing building and utilities without making the existing building and utilities comply with the requirements of this Code for new buildings. The new work shall conform to the requirements of this Code and shall not be a detriment to existing exit facilities or otherwise increase the hazard to life.

✱ **104.05 MINOR WORK ON EXISTING BUILDINGS.** Additions, alterations and repairs, made within any 12 month period, not exceeding 25 percent of the value of an existing building shall comply with this Subsection.

A. Additions and Structural Alterations. Additions and structural alterations or repairs shall not reduce the structural stability of the building. All new work shall conform to the requirements of this Code. When required by the Building Official, plans and calculations sealed by an architect or engineer registered in Arizona shall be submitted showing that the gravity and lateral load carrying capacity of the existing structural system is not reduced. In lieu of such calculations, the architect or engineer may furnish a written statement that the addition, structural alteration or repair will not reduce the gravity or lateral load carrying capacity of the existing structural system

B. Nonstructural Alterations. Nonstructural alterations and repairs may be made to the building without making the existing building nor the new work comply with the requirements of this Code for new buildings. The new work shall be of such material and method of installation that the hazard to life is not increased. Exception: The new materials installed in association with the repair, replacement or alteration of utilities shall comply with the requirements of this Code for new work.

104.06 CHANGE OF OCCUPANCY. No change shall be made in the use or occupancy of any building which would place the building in a different occupancy group unless such building is investigated and found to comply, or is made to comply, with the requirements of this Code for a new building of the proposed occupancy group except as modified in paragraphs A and B below. If additions, alterations or repairs are associated with the change of occupancy, the provisions of Subsections 104.03, 104.04 or 104.05 shall be applicable where such provisions are more restrictive. The investigation shall be made by an architect or engineer registered in Arizona unless waived by the Building Official for simple projects.

A. Structural Code Requirements. Structural investigation is not required for buildings built after January 1, 1965, unless the required floor live load increases. For buildings built prior to January 1, 1965, a structural analysis shall be submitted to the Building Official which shows that the building is not, or after repair will not be, unsafe structurally as defined in Subsection 205.01. In lieu of such structural analysis, the architect or engineer may furnish a written statement to the Building Official that he has investigated the building and has found that the building is not, or after repair will not be, unsafe structurally as defined in Subsection 205.01.

B. Nonstructural Code Requirements. After investigation and when it is claimed that compliance with specific provisions of this Code applicable to new buildings is impractical, the applicant may appeal under the provisions of Subsection 104.02B, Equivalent Safety.

104.07 MAINTENANCE. All buildings, structures and utilities, both existing and new, and all parts thereof, shall be maintained in a safe and sanitary condition. All devices, safeguards and existing facilities which are required by this Code or were required by a previous statute in a building or structure when erected, altered or repaired, shall be maintained in good working order. The owner, occupant or other person responsible for the conditions of the building, structures or utilities shall be responsible for the maintenance of buildings, structures and utilities. Utilities in good working order and in compliance to previous codes shall not be required to be changed.

In the rehabilitation of residential occupancies, the following shall be provided and/or maintained in good working order for the health and safety of the occupants: ventilation, reasonable security, weather-tight roof covering, adequate lighting, electrical outlets, hot and cold water, and adequate heating and cooling.

shall be such that no point in the exit access is more than 100 ft (30 m) from the nearest visible sign.

Exception: Signs in existing buildings need not meet the 100-ft (30-m) distance requirement.

5-10.1.4* Where low level exit signs are specifically required by Chapters 8 through 30, an approved luminescent, self-luminous, or self-illuminated sign shall be placed near the floor level below signs required for doors or in corridors by 5-10.1.2 and 5-10.1.3. This sign shall have appropriate wording in plainly legible letters not less than 4½ in. (11.4 cm) nor more than 6 in. (15.2 cm) high with the principal strokes of letters not less than ¾ in. (1.9 cm) wide. The bottom of the sign shall be not less than 6 in. (15.2 cm) nor more than 8 in. (20.3 cm) above the floor. For exit doors, the sign shall be on the door or adjacent to the door with the closest edge of the sign within 4 in. (10.2 cm) of the door frame.

5-10.1.5* Every sign required by Section 5-10 shall be so located and of such size, distinctive color, and design as to be readily visible and shall provide contrast with decorations, interior finish, or other signs. No decorations, furnishings, or equipment that impair visibility of an exit sign shall be permitted, nor shall there be any brightly illuminated sign (for other than exit purposes), display, or object in or near the line of vision to the required exit sign of such a character as to so detract attention from the exit sign.

5-10.2* Size of Signs. Every sign required by Section 5-10 shall have the word EXIT or other appropriate wording in plainly legible letters not less than 6 in. (15.2 cm) high with the principal strokes of letters not less than ¾ in. (1.9 cm) wide. The word "EXIT" shall have letters having a width not less than 2 in. (5 cm) except the letter "I," and the minimum spacing between letters shall be not less than ⅜ in. (1 cm). Signs larger than the minimum established in this paragraph shall have letter widths, strokes, and spacing in proportion to their height.

Exception No. 1: Existing approved signs.

Exception No. 2: Existing signs having the required wording in plainly legible letters not less than 4 in. (10.2 cm) high.

Exception No. 3: Signs required by 5-10.1.4.

5-10.3 Illumination of Signs.

5-10.3.1* Every sign required by 5-10.1.2 or 5-10.1.3 shall be suitably illuminated by a reliable light source. Externally and internally illuminated signs shall be visible in both the normal and emergency lighting mode.

5-10.3.2* Externally illuminated signs shall be illuminated by not less than 5 footcandles (54 lx) and shall employ a contrast ratio of not less than 0.5.

5-10.3.3* The visibility of an internally illuminated sign shall be the equivalent of an externally illuminated sign that complies with 5-10.3.2.

Exception No. 1: Approved existing signs.

Exception No. 2: Approved self-luminous or electroluminescent signs that operate in the 5,000 to 6,000 angstrom range that provide evenly illuminated letters may have a minimum luminance of 0.06 footlamberts (0.21 cd/sq m).*

5-10.3.4 Every sign required by 5-10.1.4 shall provide evenly illuminated letters having a minimum luminance of 0.06 footlamberts (0.21 cd/sq m).

Exception: Signs complying with the requirements of 5-10.3.3 are acceptable.

5-10.3.5 Every sign required to be illuminated by 5-10.3 shall be continuously illuminated as required under the provisions of Section 5-8.

Exception: Illumination for signs shall be permitted to flash on and off upon activation of the fire alarm system.*

5-10.3.6 Where emergency lighting facilities are required by the applicable provisions of Chapters 8 through 30 for individual occupancies, the exit signs, except approved self-luminous signs, shall be illuminated by the emergency lighting facilities. The level of illumination of the exit sign shall be at the levels provided in accordance with 5-10.3.2 or 5-10.3.3 for the required emergency lighting time duration as specified in 5-9.2.1 but shall be permitted to decline to 60 percent of the illumination level at the end of the emergency lighting time duration.

5-10.4 Specific Requirements.

5-10.4.1 Directional Signs.

5-10.4.1.1* A sign complying with 5-10.2 reading EXIT or a similar designation with an arrow indicating the direction of travel shall be placed in every location where the direction of travel to reach the nearest exit is not immediately apparent.

5-10.4.1.2 Arrow Designator. The arrow shall be located outside of the EXIT legend, not less than ⅛ in. (1 cm) from any letter, and may be integral to or separate from the sign body. The arrow shall be of such size, character and location that it is plainly visible and identifiable as a directional arrow.

Exception: Existing approved signs.

5-10.4.2* Special Signs. Any door, passage, or stairway that is neither an exit nor a way of exit access and that is so located or arranged that it is likely to be mistaken for an exit shall be identified by a sign reading NO EXIT. Such sign shall have "NO" letters 2 in. (5 cm) high with stroke width of ⅛ in. (1 cm) and "EXIT" letters 1 in. (2.5 cm) high, with the word "EXIT" below "NO."

Exception: Approved existing signs.

* SECTION 5-11 SPECIAL PROVISIONS FOR OCCUPANCIES WITH HIGH HAZARD CONTENTS *(See Section 4-2.)*

5-11.1* In all cases where the contents are classified as high hazard, exits shall be provided of such types and numbers and so arranged as to permit all occupants to escape from the building or structure or from the hazardous area thereof to the outside or to a place of safety with a travel distance of not over 75 ft (23 m), measured as specified in 5-6.2.

5-11.2 Capacity of means of egress provided in accordance with 5-11.1 shall be as specified in the applicable section of Chapters 8 through 30 but not less than such as to provide 0.7 in. per person (1.8 cm/person) where exit is by inside or outside stairs or 0.4 in. per person (1.0 cm/person) where exit is by doors at grade level, by horizontal exits, or by Class A ramps.

5-11.3 At least two exits shall be provided from each building or hazardous area thereof.

Exception: Rooms or spaces not greater than 200 sq ft (18.6 sq m) and having an occupant load of not greater than three persons and having a maximum travel distance to the room door of 25 ft (7.6 m).

5-11.4 Means of egress shall be so arranged that there are no dead-end pockets, hallways, corridors, passageways, or courts.

2-3.2 A *laboratory unit* shall *not* be considered to contain an explosion hazard *unless* a laboratory work area *within that unit* contains an explosion hazard great enough to cause major property damage or serious injury *outside that laboratory work area.*

2-3.3 For explosion hazard protection requirements, see Chapter 5.

Table 2-2. Maximum Quantities of Flammable and Combustible Liquids in Laboratory Units Outside of Flammable Liquid Storage Rooms[7]

Laboratory Unit Class	Flammable or Combustible Liquid Class	*Excluding* Quantities in Storage Cabinets[7] and Safety Cans			*Including* Quantities in Storage Cabinets[7] and Safety Cans		
		Maximum Quantity[3] Per 100 Square Feet of Laboratory Unit	Maximum Quantity[3,4] Per Laboratory Unit		Maximum Quantity[3] Per 100 Square Feet of Laboratory Unit	Maximum Quantity[3,4] Per Laboratory Unit	
			Unsprinklered	Sprinklered[6]		Unsprinklered	Sprinklered[6]
A[1]	I	10 Gallons	300 Gallons	600 Gallons	20 Gallons	600 Gallons	1200 Gallons
(High Hazard)	I, II and IIIA[5]	20 Gallons	400 Gallons	800 Gallons	40 Gallons	800 Gallons	1600 Gallons
B[2]	I	5 Gallons	150 Gallons	300 Gallons	10 Gallons	300 Gallons	600 Gallons
(Intermediate) Hazard)	I, II and IIIA[5]	10 Gallons	200 Gallons	400 Gallons	20 Gallons	400 Gallons	800 Gallons
C[2]	I	2 Gallons	75 Gallons	150 Gallons	4 Gallons	150 Gallons	300 Gallons
(Low Hazard)	I, II and IIIA[5]	4 Gallons	100 Gallons	200 Gallons	8 Gallons	200 Gallons	400 Gallons

[1] Class A Laboratory units shall not be used as instructional laboratory units.

[2] Maximun quantities of flammable and combustible liquids in Class B and Class C instructional laboratory units shall be 50% of those listed in the Table.

[3] For maximum container sizes, see Table 7-2.

[4] Regardless of the maximum allowable quantity, the maximum amount in a laboratory unit shall never exceed an amount calculated by using the maximum quantity per 100 square feet of laboratory unit. The area of offices, lavatories, and other contiguous areas of a laboratory unit are to be included when making this calculation.

[5] The maximum quantities of Class I liquids shall not exceed the quantities specified for Class I liquids alone.

[6] Where water may create a serious fire or personnel hazard, a nonwater extinguishing system may be used instead of sprinklers.

[7] See description of Flammable Liquid Storage Room in Section 4-4 of NFPA 30, *Flammable and Combustible Liquids Code*. See description of Storage Cabinet in Section 4-2 of NFPA 30.

For SI Units: 1 gal = 3.785 L; 100 sq ft = 9.3 m².

Chapter 3 Laboratory Unit Design and Construction

3-1* Laboratory Unit Enclosure.

3-1.1 The required construction of laboratory units depends on the laboratory unit fire hazard classification, the area of the laboratory unit, and the protection to be provided.

3-1.2 The construction requirements are the minimum permitted and do not exclude the use of construction with greater fire resistance.

3-1.3 Laboratory units shall be separated from nonlaboratory areas by construction equal to or greater than the fire resistance requirements shown in Table 3-1.

3-1.4 Laboratory units shall be separated from other laboratory units of equal or lower hazard by construction equal to or greater than the fire resistance requirements shown in Table 3-1.

3-1.5 Laboratory units shall be separated from other laboratory units of a higher hazard class by construction equal to or greater than the fire resistance requirements shown in Table 3-1.

3-1.6 Penetrations of fire-rated floor/ceiling and wall assemblies shall be protected so as to retain the required fire resistance rating and to prevent the passage of smoke, fire, or vapors between such fire-rated floors or through such fire-rated walls. (*See 6-11.3*).

Exception: As allowed in subsection 6-11.3.

3-1.7 All floor openings shall be sealed or curbed to prevent liquid leakage to lower floors.

3-2 Maximum Area of Laboratory Units. The maximum area of a laboratory unit shall be determined by the fire hazard classification, the construction of the laboratory unit, and the fire protection provided, as shown in Table 3-1.

3-3* Requirements for Means of Egress. Means of egress for laboratory buildings, laboratory units, and laboratory work areas shall comply with NFPA *101, Life Safety Code*.

✱ 3-4 Means of Access to an Exit.

3-4.1* A second means of access to an exit shall be provided from a laboratory work area if any of the situations described in (a) through (f) exist.

(a) A laboratory work area contains an explosion hazard so located that an incident would block escape from or access to the laboratory work area.

Table 3-1. Construction and Fire Protection Requirements for Laboratory Units[1]
(See also A-3-1.)

Laboratory Unit Fire Hazard Class	Area of Laboratory Unit, Square Feet	Nonsprinklered Laboratory Units				✱Sprinklered Laboratory Units[2]	
		Construction Types I and II[3]		Construction Types III, IV and V[3]		Any Construction Type[3]	
		Separation from Non-laboratory Areas	Separation From Lab. Units of Equal or Lower Hazard Classification	Separation from Non-laboratory Areas	Separation From Lab. Units of Equal or Lower Hazard Classification	✱ Separation from Non-laboratory Areas	Separation From Laboratory Units of Equal or Lower Hazard Classification
A	Under 1000	1 Hour	1 Hour	2 Hours	1 Hour	1 Hour	NC/LC[5,6]
	1001-2000	1 Hour	1 Hour	N/A[4]	N/A	1 Hour	NC/LC
	2001-5000	2 Hours	1 Hour	N/A	N/A	1 Hour	NC/LC
	5001-10,000	N/A[4]	N/A	N/A	N/A	1 Hour	NC/LC
	10,001 or more	N/A	N/A	N/A	N/A	N/A[4]	N/A
B	Under 20,000	1 Hour	NC/LC[5,6]	1 Hour	1 Hour	NC/LC[5,7]	NC/LC
	20,000 or more	N/A	N/A	N/A	N/A	N/A	N/A
C	Under 10,000	1 Hour	NC/LC[5,7]	1 Hour	NC/LC[5,7]	NC/LC[5,7]	NC/LC[5,6]
	10,000 or more	1 Hour	NC/LC	1 Hour	1 Hour	NC/LC[5,7]	NC/LC

[1] Where a laboratory work area or unit contains an explosion hazard, appropriate protection shall be provided for adjoining laboratory units and nonlaboratory areas, as specified in Chapter 5.
[2] In laboratory units where water may create a serious fire or personnel hazard, a nonwater extinguishing system may be substituted for sprinklers.
[3] See Appendix B-3.
[4] N/A = Not Allowed; NC/LC = Noncombustible/Limited-Combustible Construction. (See Appendix B-3.)
[5] May be ½-hour fire-rated combustible construction.
[6] Existing combustible construction is acceptable.
[7] Laboratory units in educational occupancies shall be separated from nonlaboratory areas by 1-hour construction.
For SI Units: 1 sq ft = 0.093 m².

✱ See bottom of page.

(b) A laboratory work area within a Class A laboratory unit exceeds 500 sq ft (46.5 m²).

(c) A laboratory work area within a Class B or Class C laboratory unit exceeds 1000 sq ft (92.9 m²).

(d) A hood in a laboratory work area is located adjacent to the primary means of exit access.

(e) There is a compressed gas cylinder in use which:

1. is larger than lecture bottle size, *and*

2. contains a gas which is flammable or has a Health Hazard rating of 3 or 4, *and*

3. could prevent safe egress in the event of accidental release of cylinder contents. (*See Section 8-2.*)

(f) There is a cryogenic container in use which:

1. contains a flammable gas or has a Health Hazard Rating of 3 or 4, *and*

2. could prevent safe egress in the event of accidental release of container contents. (*See Section 8-3.*)

3-4.2 The required exit doors of all laboratory work areas within Class A or Class B laboratory units shall swing in the direction of exit travel.

3-5* Furniture and Equipment. Furniture and equipment in laboratory work areas shall be arranged so that means of access to an exit may be reached easily from any point.

3-6 Electrical Installation. All electrical installations, including wiring and appurtenances, apparatus, lighting, signal systems, alarm systems, remote control systems, or parts thereof, shall comply with NFPA 70, *National Electrical Code®*.

3-6.1 Electrical receptacles, switches, and controls shall be located so as not to be subject to liquid spills.

3-6.2 Laboratory work areas and laboratory units shall be considered as unclassified electrically with respect to Article 500 of NFPA 70, *National Electrical Code*.

Exception: Under some conditions of extraordinary hazard, it may be necessary to classify a laboratory work area, or a part thereof, as a hazardous location, for the purpose of designating suitable electrical installations. (See 9-2.2 and 9-2.5.)

Chapter 4 Fire Protection

4-1 General.

4-1.1 All laboratory units shall be provided with fire protection appropriate to the fire hazard as follows:

(a) Portable fire extinguishers (*see Section 4-4*).

(b) Fire alarm systems (*see Section 4-5*).

(c) Evacuation and emergency plans (*see Section 4-6*).

4-1.2 In addition to the fire protection specified in 4-1.1, laboratory units under some conditions shall be provided with automatic extinguishing systems (*see Section 4-2*) and inside standpipe and hose systems (*see Section 4-3*).

BC Appendix, Chapter 1, Division 1 Sec. 116 - When approved by the Building Officical, existing good lath & plaster in good condition or 1/2" gypsum wall board may be acceptable where one-hour occupancy separation are required.

landing having a minimum 30-inch run in the direction of travel shall be provided at each point of access to the stairway.

EXCEPTION: Fire escapes as provided for in this section.

Exterior stairs shall be of noncombustible construction.

EXCEPTION: On buildings of Types III, IV and V, provided the exterior stairs are constructed of wood not less than 2-inch nominal thickness.

(c) **Corridors.** Corridors of Groups A, B, E, I, H and R, Division 1 Occupancies serving as an exit for an occupant load of 30 or more shall have walls and ceilings of not less than one-hour fire-resistive construction as required by this code. Existing walls surfaced with wood lath and plaster in good condition or 1/2-inch gypsum wallboard or openings with fixed wired glass set in steel frames are permitted for corridor walls and ceilings and occupancy separations when approved. Doors opening into such corridors shall be protected by 20-minute fire assemblies or solid wood doors not less than 1 3/4 inches thick. Where the existing frame will not accommodate the 1 3/4-inch-thick door, a 1 3/8-inch-thick solid bonded wood core door or equivalent insulated steel door shall be permitted. Doors shall be self-closing or automatic-closing by smoke detection. Transoms and openings other than doors from corridors to rooms shall comply with Section 3305 (h) of this code or shall be covered with a minimum of 3/4-inch plywood or 1/2-inch gypsum wallboard or equivalent material on the room side.

✱ **EXCEPTION:** Existing corridor walls, ceilings and opening protection not in compliance with the above may be continued when such buildings are protected with an approved automatic sprinkler system throughout. Such sprinkler system may be supplied from the domestic water system if it is of adequate volume and pressure.

(d) **Fire Escapes.** 1. Existing fire escapes which in the opinion of the building official comply with the intent of this section may be used as one of the required exits. The location and anchorage of fire escapes shall be of approved design and construction.

2. Fire escapes shall comply with the following:

Access from a corridor shall not be through an intervening room.

All openings within 10 feet shall be protected by three-fourths-hour fire assemblies. When located within a recess or vestibule, adjacent enclosure walls shall be of not less than one-hour fire-resistive construction.

Egress from the building shall be by a clear opening having a minimum dimension of not less than 29 inches. Such openings shall be openable from the inside without the use of a key or special knowledge or effort. The sill of an opening giving access shall be not more than 30 inches above the floor of the building or balcony.

Fire escape stairways and balconies shall support the dead load plus a live load of not less than 100 pounds per square foot and shall be provided with a top and intermediate handrail on each side. The pitch of the stairway shall not exceed 60 degrees with a minimum width of 18 inches. Treads shall be not less than 4 inches in width and the rise between treads shall not exceed 10 inches. All stair and

APPENDIX

Chapter 1
Division I
LIFE-SAFETY REQUIREMENTS FOR EXISTING BUILDINGS OTHER THAN HIGH-RISE BUILDINGS

General

Sec. 110. (a) **Purpose.** The purpose of this division is to provide a reasonable degree of safety to persons occupying existing buildings by providing for alterations to such existing buildings which do not conform with the minimum requirements of this code.

EXCEPTION: Group R, Division 3, Group M; and high-rise occupancies.

(b) **Effective Date.** Within 18 months after the effective date of this division, plans for compliance shall be submitted and approved, and within 18 months thereafter the work shall be completed or the building shall be vacated until made to conform.

Exits

Sec. 111. (a) **Number of Exits.** Every floor above the first story used for human occupancy shall have access to at least two separate exits, one of which may be an exterior fire escape complying with Subsection (d) of this section. Subject to the approval of the building official, an approved ladder device may be used in lieu of a fire escape when the construction feature or location of the building on the property make the installation of a fire escape impracticable.

EXCEPTION: In all occupancies, second stories with an occupant load of 10 or less may have one exit.

An exit ladder device when used in lieu of a fire escape shall conform with U.B.C. Standard No. 33-3 and the following:

1. Serves an occupant load of 10 or less or a single dwelling unit or guest room.
2. The building does not exceed three stories in height.
3. The access is adjacent to an opening as specified for emergency egress or rescue or from a balcony.
4. Shall not pass in front of any building opening below the unit being served.
5. The availability of activating the device for the ladder is accessible only from the opening or balcony served.
6. So installed that it will not cause a person using it to be within 6 feet of exposed electrical wiring.

(b) **Stair Construction.** All required stairs shall have a minimum run of 9 inches and a maximum rise of 8 inches and shall have a minimum width of 30 inches exclusive of handrails. Every stairway shall have at least one handrail. A

(d) **Width.** The unobstructed width of pedestrian walkways shall be not less than 44 inches. The total width of a pedestrian walkway shall not exceed 30 feet.

(e) **Maximum Length.** The length of a pedestrian walkway shall not exceed 300 feet.

EXCEPTIONS: 1. Pedestrian walkways that are fully sprinklered may be 400 feet in length.

2. Unenclosed walkways at grade.

(f) **Multiple Pedestrian Walkways.** The distance between any two pedestrian walkways on the same horizontal plane shall be not less than 40 feet.

(g) **Required Exits.** Pedestrian walkways at other than grade shall not be used as required exits. Pedestrian walkways at grade level used as required exits shall provide an unobstructed means of egress to a public way and shall have a minimum width in accordance with Section 3303 (b).

EXCEPTION: Pedestrian walkways conforming to the requirements of a horizontal exit may be used as a required exit.

(h) **Pedestrian Walkways Over Public Streets.** Pedestrian walkways over public streets shall be subject to the approval of local jurisdictions.

Sanitation

Sec. 510. (a) **Water Closet Room Separation.** A room in which a water closet is located shall be separated from food preparation or storage rooms by a tight-fitting door.

(b) **Floors and Walls in Water Closet Compartment and Showers.** In other than dwelling units, toilet room floors shall have a smooth, hard, nonabsorbent surface such as portland cement, concrete, ceramic tile or other approved material which extends upward onto the walls at least 5 inches. Walls within water closet compartments and walls within 2 feet of the front and sides of urinals shall be similarly finished to a height of 4 feet and, except for structural elements, the materials used in such walls shall be of a type which is not adversely affected by moisture. See Section 4712 for other limitations.

In all occupancies, accessories such as grab bars, towel bars, paper dispensers and soap dishes, etc., provided on or within walls, shall be installed and sealed to protect structural elements from moisture.

Showers in all occupancies shall be finished as specified above to a height of not less than 70 inches above the drain inlet. Materials other than structural elements used in such walls shall be of a type which is not adversely affected by moisture. See Section 4712 for other limitations.

✱ Access to Toilets and Other Facilities

Sec. 511. (a) **Access to Water Closets.** Each water closet stool shall be located in a clear space not less than 30 inches in width and have a clear space in front of the water closet stool of not less than 24 inches.

Where toilet facilities are provided on any floor where access by the physically handicapped is required by Table No. 33-A, at least one such facility for each sex

USE[1]	MINIMUM OF TWO EXITS OTHER THAN ELEVATORS ARE REQUIRED WHERE NUMBER OF OCCUPANTS IS AT LEAST	OCCUPANT LOAD FACTOR[2] (Sq. Ft.)	ACCESS BY MEANS OF A RAMP OR AN ELEVATOR MUST BE PROVIDED FOR THE PHYSICALLY HANDICAPPED AS INDICATED[3]
11. Exercising Rooms	50	50	Yes
12. Garage, Parking	30	200	Yes[9]
13. Hospitals and Sanitariums—Nursing Homes	6	80	Yes
14. Hotels and Apartments	10	200	Yes[10]
15. Kitchen—Commercial	30	200	No
16. Library Reading Room	50	50	Yes[4]
17. Locker Rooms	30	50	Yes
18. Malls (see Chapter 56)	—	—	—
19. Manufacturing Areas	30	200	Yes[7]
20. Mechanical Equipment Room	30	300	No
21. Nurseries for Children (Day care)	7	35	Yes
✱ 22. Offices	30	100	Yes[7]
23. School Shops and Vocational Rooms	50	50	Yes
24. Skating Rinks	50	50 on the skating area; 15 on the deck	Yes[4]
25. Storage and Stock Rooms	30	300	No
26. Stores—Retail Sales Rooms Basement Ground Floor Upper Floors	 11 50 10	 30 30 60	 Yes Yes Yes
27. Swimming Pools	50	50 for the pool area; 15 on the deck	Yes[4]
28. Warehouses	30	500	No
29. All others	50	100	

(Footnotes appear on page 666.)

APPENDIX C

MINIMUM PLUMBING FACILITIES[1]

*Revise Appendix C

Type of Building or Occupancy[2]	Water Closets[16, 18] (Fixtures per person)	Urinals[8] (Fixtures per person)	Lavatories[16, 18, 21] (Fixtures per person)	Bathtubs or Showers (Fixtures per person)	Drinking Fountains[3, 12] (Fixtures per person)
Assembly Places — Theatres, Auditoriums, Convention Halls, etc. — for permanent employee use.	*Male* 1:1-15 2:16-35 3:36-55 Over 55, add 1 fixture for each additional 40 persons *Female* 1:1-15 2:16-35 3:36-55 Over 55, add 1 fixture for each additional 40 persons	1 per 50	*Male* 1 per 40 *Female* 1 per 40	- - - - - - -	- - - - -
Assembly Places[24] Theatres, Auditoriums, Convention Halls, etc. - for public use	*Male* 1:1-100 2:101-200 2:201-400 *Female* 1:1-25 2:26-50 3:51-75 4:76-100 5:101-125 Over 400 add 2 fixtures for each additional 500 males. For more than 125 females see Footnote 24.	1:1-100 2:101-200 3:201-400 4:401-600 Over 600 add 1 fixture for each additional 300 males	*Male* 1:1-200 2:201-400 3:401-750 Over 750, add 2 fixtures for each additional 500 persons *Female* 2:1-200 3:201-400 4:401-750	- - - - - - -	Footnote 11
Dormitories[8] School or Labor	*Male* 1 per 10 *Female* 1 per 8 Add 1 fixture for each additional 25 males (over 10) and 1 for each additional 20 females (over 8)	1 per 25 Over 150, add 1 fixture for each additional 50 males	*Male* 1 per 12 Over 12, add 1 fixture for each additional 20 males and 1 for each 15 females *Female* 1 per 12	1 per 8 For female, add 1 bathtub per 30. Over 150, add 1 per 20	Footnote 11
Dormitories - for staff use	*Male* 1:1-15 2:16-35 3:36-55 *Female* 1:1-15 2:16-35 3:36-55 Over 55, add 1 fixture for each additional 40 persons	1 per 50	*Male* 1 per 40 *Female* 1 per 40	- - - - - - -	- - - - -
Dwellings[4, 22]					
Hospitals Waiting Room For employee use	1 per room *Male* 1:1-15 2:16-35 3:36-55 *Female* 1:1-15 2:16-35 3:36-55 Over 55, add 1 fixture for each additional 40 persons	- - - - - 1 per 50	1 per room *Male* 1 per 40 *Female* 1 per 40	- - - - - - - - - - - -	1 per 75
Hospitals Individual Room Ward Room	1 per room 1 per 8 patients	- - - - - - - - - -	1 per room 1 per 10 patients	1 per room 1 per 20 patients	- - - - - 1 per 75
Industrial[5] Ware-Houses, Workshops, Foundries and similar establishments (for employee use)	*Male* 1:1-10 2:11-25 3:26-50 4:51-75 5:76-100 *Female* 1:1-10 2:11-25 3:26-50 4:51-75 5:76-100 Over 100, add 1 fixture for each additional 30 persons	Footnote 20	Up to 100, 1 per 10 persons Over 100, 1 per 15[6, 7] persons	1 shower for each 15 persons exposed to excessive heat or to skin contamination with poisonous, infectious, or irritating material.	1 per 75

*Revised July 28, 1989, Ordinance No. G-3249

Type of Building or Occupancy[2]	Water Closets[16, 18] (Fixtures per person)	Urinals[8] (Fixtures per person)	Lavatories[16, 18, 21] (Fixtures per person)	Bathtubs or Showers (Fixtures per person)	Drinking Fountains[3, 12] (Fixtures per person)
Institutional — other than Hospitals or Penal Institutions (on each occupied floor)	*Male* 1 per 25 *Female* 1 per 20	1 per 50	*Male* 1 per 10 *Female* 1 per 10	1 per 8	1 per 75
Institutional — other than Hospitals or Penal Institution (on each occupied floor) — for employee use	*Male* 1:1-15 2:16-35 3:36-55 *Female* 1:1-15 2:16-35 3:36-55 Over 55, add 1 fixture for each additional 40 persons	1 per 50	*Male* 1 per 40 *Female* 1 per 40	- - - - - - -	- - - - -
Office, Public Buildings and Mercantile[17, 19]	*Male* 1:1-15 2:16-35 3:36-55 4:56-80 5:81-110 6:111-150 *Female* 1:1-15 2:16-35 3:36-55 4:56-80 5:81-110 6:111-150 Over 150, add 1 fixture for each additional 40 persons	Footnote 20	*Male* 1:1-15 2:16-35 3:36-60 4:61-90 5:91-125 *Female* 1:1-15 2:16-35 3:36-60 4:61-90 5:91-125 Over 125, add 1 fixture for each additional 45 persons	- - - - - - -	Footnote 11
Office or Public Buildings For employee use	*Male* 1:1-15 2:16-35 3:36-55 *Female* 1:1-15 2:16-35 3:36-55 Over 55, add 1 fixture for each additional 40 persons	1 per 50	*Male* 1 per 40 *Female* 1 per 40	- - - - - - -	- - - - -
Penal Institutions — For employee use	*Male* 1:1-15 2:16-35 3:36-55 *Female* 1:1-15 2:16-35 3:36-55 Over 55, add 1 fixture for each additional 40 persons	1 per 50	*Male* 1 per 40 *Female* 1 per 40	- - - - - - - - - - - -	1 per 75
Penal institutions — For prisoner use Cell Exercise Room	1 per cell 1 per exercise room	- - - - - - 1 per exercise room	1 per cell 1 per exercise room	- - - - - - - - - - - -	1 per cell block floor 1 per exercise room
Restaurants, Pubs and Lounges[10]	*Male* 1:1-50 2:51-150 3:151-300 *Female* 1:1-25 2:26-75 3:76-150 4:150-225 Over 300 males add 1 fixture for each additional 200 males. Over 225 females add 1 fixture for each 100 females.	Footnote 20	*Male* 1:1-150 2:151-200 3:201-400 *Female* 1:1-150 2:151-200 3:201-400 Over 400, add 1 fixture for each additional 400 persons	- - - - - - -	- - - - - Footnote 11
Schools — For staff use All schools	*Male* 1:1-15 2:16-35 3:36-55 *Female* 1:1-15 2:16-35 3:36-55 Over 55, add 1 fixture for each additional 40 persons	1 per 50	*Male* 1 per 40 *Female* 1 per 40	- - - - - - -	- - - - -